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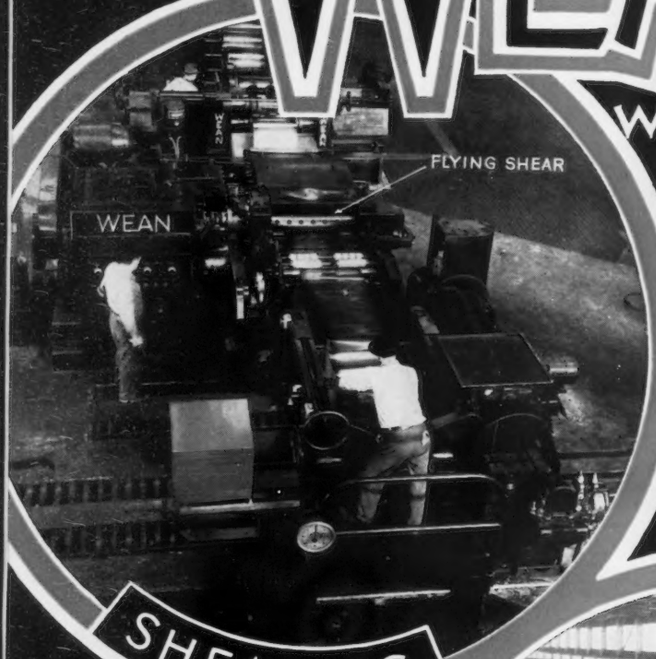

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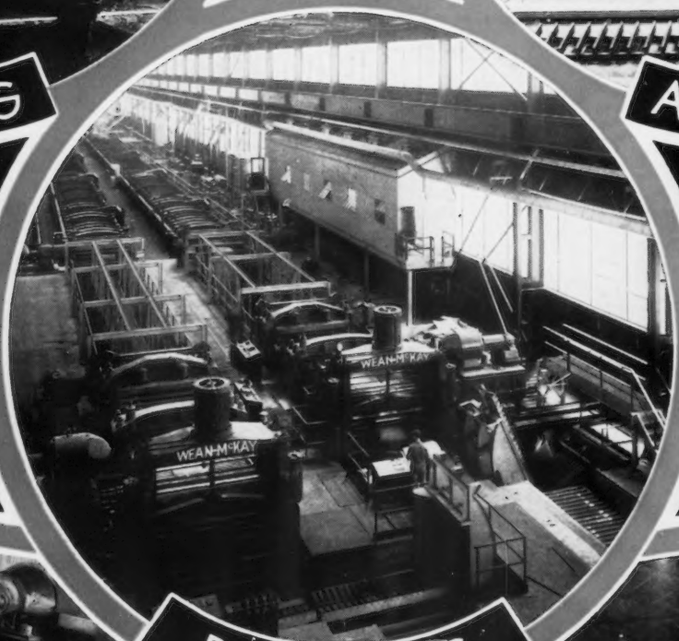

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APRIL 10, 1941

VOL. 147, NO. 15

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The Iron Age

APRIL 10, 1941

ESTABLISHED 1855

"The Truth Is Not in Them"

HONEST American labor, union or non-union, has nothing to fear from American public opinion, once the facts are set forth. Dishonest American labor leadership has everything to fear from it.

Honest American management has nothing to fear from the right of labor to exercise its free will through its appointed agents. Both honest management and honest labor have much to fear when that exercise of free will is suppressed or distorted through the trickery of dishonest labor agents.

Honest American labor, union or non-union alike, is patriotic. It does not desire through its actions to impede the progress of American defense. Nor does the public want it to. Nor does it want the public to gain the impression that labor is unfair, unpatriotic and subversive to national interests.

Why, then, the epidemic of strikes which have been taking place in our defense industries and that are doing more to help Hitler than all of the bombings of London?

It is simply and solely because the expression of the free will of labor has been suppressed by the skullduggery, trickery and dishonesty of a certain number of its chosen representatives.

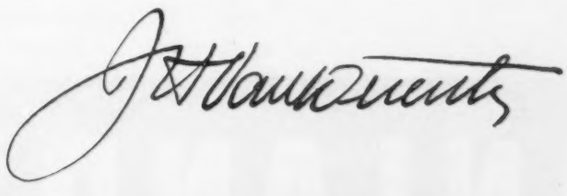
Take the case at Allis Chalmers. The majority of workers in that plant desired to remain at work. They did not want to strike. Their chosen representatives of the CIO knew that. Otherwise it would not have been necessary for these CIO leaders to stuff the strike ballot boxes with 2000 or more forged strike votes. If the will of the majority had been honestly represented that strike would not have taken place.

If the will of the majority had been permitted free expression in connection with the other strikes that are threatening our defense program, there would be no strike problem in this country today.

The situation could be cured overnight without mandates or pleadings from Washington. All that is necessary is to see to it that every strike vote is conducted under the auspices of an independent agency that is honest and impartial. And the same thing applies to every vote held to terminate or continue a strike.

This is supposed to be a democracy. We elect our public representatives on that basis and it is their duty to carry out majority will. In our elections we safeguard the honesty of the ballot and its secrecy. We do not permit sluggers or solicitors near the polls. And we impose prison sentences upon tricksters and forgers.

Why not apply this principle of democracy to strike votes? It would cure our strike troubles immediately even though it might jail certain labor misleaders.



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The Place of

Plywood, Plastics and Corrosion Resistant Steel

In Aircraft Construction

By THOMAS H. HUFF
Johns Hopkins University
and
Consulting Design Engineer,
Glenn L. Martin Co.

o o o

ONE of the most interesting aspects of aircraft development has been the evolution of basic materials. And, today, there is evidence that the industry is on the threshold of still another great era in this revolutionary process—plywood, plastics and stainless steel. It is not an era into which the industry can plunge headlong, however, relatively short steps must be taken for a time.

There are few in the industry who have been privileged to pass through all the eras of this aviation age. The first and worst was the good old "stick-and-wire" era, with the question paramount in everyone's mind with each new creation—"will she fly?" This era extended up to and partly through the World War, but toward the end of the struggle the industry saw another development — plywood — coming into its own. Indeed, the actual American production of DH-4's was of plywood, with blood albumin glue for the bonding medium—an outgrowth of English development.

Immediately after the war, and based on Tony Fokker's production methods, welded steel tubing for fuselages, and cantilever and semi-thick section wings came into use—both plywood and fabric covered.

The next materials era brought part sheet metal, corrugated aluminum sheet and steel tubing. This was the forerunner of the metal development. Finally, the industry arrived at the still current era of all-metal smooth skin that has done so much to augment the airplane's speed with load, and place it for all time squarely in the transportation field.

This evolution has not, of course, been marked by stops and starts. There have been overlapping periods, each of them carrying along some pioneering soul willing to "stick his neck out" and do the very thing his good brethren were crying could not be done.

In all this work and development there have been, however, very definite reasons behind each period and each change. Some of these are known and recognized; others have been forgotten in the glamor of some new effort. But, in the final analysis, the real reasons for their use have had solid foundations in necessity and logic.

Therefore, the patience of those in the industry is tried sorely when they read the sweeping claims for some new and "revolutionary" method of producing airplanes out of green cheese to supplant present industry overnight, put all the trained men out of work and start airplanes rolling off the assembly lines by Tuesday morning at the rate of not less than 100 per day. It just isn't done that way.

Bitter or sweet, experience has long since given the industry an idea of the time involved to complete a construction era in the airplane industry. Just call it eight years and be satisfied that this is just about right.

Be satisfied, too, that there are not any rabbits in the hat, and with this in mind take a look at the plastic and stainless steel situations, see what they have to offer and perhaps indicate some of the problems still to be solved. Of course, it must be realized that these problems are details, but it certainly must not be forgotten that there are generally 10,000 to 20,000 details making up an airplane, and some of them can be terribly difficult.

Perhaps the field of plastics should be taken first, for it is the older of the two; indeed, it might even be regarded as "of age," for it has already seen more than 21 years in various forms and disguises. Just now the salient new tricks are really good glue to stick things together and the means of grinding it up and making castings or pressings that have great possibilities. From telephones to ashtrays, the ordinary household objects show clearly the progress in some fields of plastics.

The first and oldest form, dating back to 1918, was laminated wood construction. The new adhesives offered today overcome many of our original difficulties but they do not eliminate one of the fundamental problems, namely, the handling of wood in large quantities. This requires controlled atmospheric factory conditions and the final surface

protection under the most severe weathering of all known operations.

It is necessary to go into the archives to study some of these production problems. Found there is the need to consider the procurement not of commercial plywood, but of a very special wood, all of which must be carefully blessed from the time the tree is chosen in the forest until the veneers are cut or sawn and then aged and glued under most accurate mechanical and atmospheric control, up to the time the material gets into the aircraft plant's raw stores before use. Only one of these operations has to do with the possible new development. It concerns the binder used for the adhesive, and while that is, of course, the secret of the modern plywood success, it is only a fractional part of the problem involved.

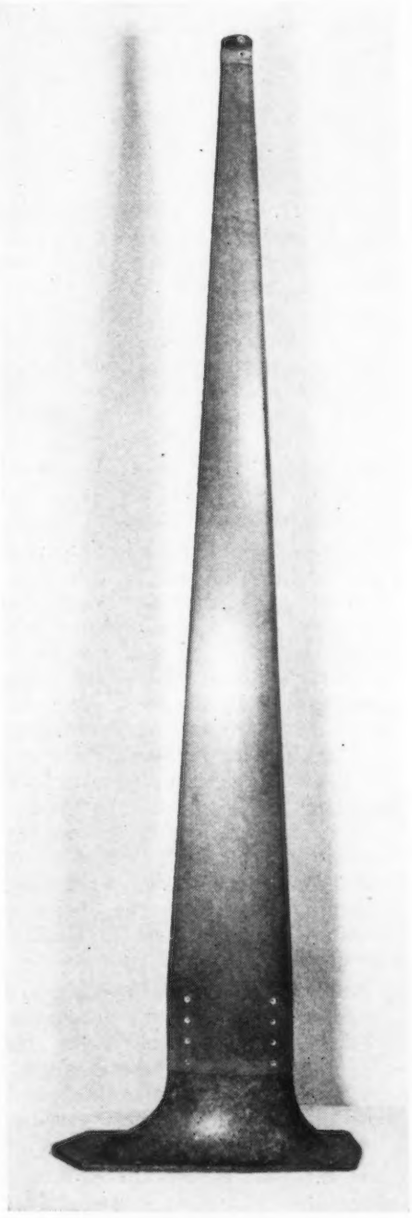
Before the benefits that are possible from some of the newer forms of laminated wood can be secured, it is necessary to develop new engineering data that are acceptable to the services. Since the normal laminated woods are unimpregnated and non-compressed, the use of the newer resinous adhesives can have but little, if any, effect upon the allowable strength criteria, and the basic characteristics of the wood itself remain unchanged. These data have been accumulated over at least a 20-year period by the Forest Products Laboratory, and any modification in these values must take into consideration the large number of variables that enter into any living growing substance, making up the major portion of a basic strength material.

There is a definite improvement made possible by the resinous glues, by the added operations of impregnating the wood fibers and also by

TABLE I

Recommendations for the Use of Plywood, Plastics and Stainless Steel

	Plywood	Plastics	Stainless Steel
ARMAMENT:			
Boxes, ammunition, flexible gun	*	*	*
Miscellaneous brackets, supports, special bolts, etc.			*
Bomb installation parts and controls		*	
Pyrotechnic installation parts and controls	*	*	*
CONTROLS IN FUSELAGE:			
Plane—control wheels and quadrants		*	
Miscellaneous brackets, guides, special pulleys, supports, special bolts or pins, etc.			*
ENGINE:			
Engine accessory cowling, supports, brackets, etc.			*
Engine ring cowling flaps		*	*
Carburetor air intake			*
Exhaust manifold stacks, or collector rings			*
Firewall			*
Ducts, air			*
EQUIPMENT:			
Instrument board	*	*	
Battery box and drain		*	*
Seats	*	*	*
Flight report holders and data cases	*	*	*
Map cases and supports	*	*	*
Hand fire extinguishers, brackets, etc.		*	*
Radio racks and shelf for key	*	*	*
Camera racks and view finders		*	*
Table, navigator's	*	*	*
Miscellaneous brackets, supports, absorbers, special bolts, etc., for all the above		*	*
FUEL SYSTEM:			
Auxiliary tank			*
Tank supports, brackets, straps, links, special bolts		*	*
OIL SYSTEM:			
Tanks			*
Supports, brackets, filters, valves, special bolts, etc.		*	*
FUSELAGE:			
Nose wheel doors	*		*
Fuselage nose	*	*	
Gunner turrets		*	*
Floors	*		*
Lower rear gunner's door, not including glass	*		*
Cockpit enclosure complete, less glass		*	*
Lavatory equipment		*	*
Flaps, complete, left and right	*		*
NACELLE:			
Structure and mounting parts (if detachable)	*		*
Nacelle panels, including landing gear doors	*		*
TAIL SURFACES (including attaching pins, bolts, etc.):			
Stabilizer, horizontal complete	*		*
Elevator, complete			*
Elevator tabs		*	*
Stabilizers, vertical complete	*		*
Rudders, complete			*
Rudder tabs		*	*
Fairings and inspection cover plates including stabilizers, elevators, bracing parts, etc.	*		*
Miscellaneous attaching special bolts, pins, etc.			*
OUTER WINGS:			
Wing, spars			*
Tips covered complete	*		*
Flaps, complete, left and right	*		*
Ailerons, left and right, covered complete			
Wings outer	*		*
Aileron tabs		*	
ITEMS NOT COVERED ABOVE:			
Bomb bay doors	*		*
Engine exhaust shrouds			*
Heating and ventilating equipment ducts		*	*



AN antenna mast; it has a macerated molded base and laminated mast.

THIS plywood bomb bay door is used on many modern aircraft.

subsequent compression of the fibers to increase the density of the resulting laminated or plane board. The amount of gain by this process will have to be studied over a period of years to determine the uniformity and the effect of variables upon woods of different natures and under varying atmospheric and temperature conditions. At the present time insufficient data are available to permit their use in structural calculation.

A much more difficult point has still to be solved—namely, the use of and effect of cold-setting adhesives that must be used in the assembly of all articles manufactured from the laminated boards. To date, no final answer is available and the engineer is again limited to old data. These are not insurmountable obstacles, but time is the only cure and in the defense program now facing this country there is no time. "M" day is here.

The industry, therefore, is limited to past knowledge of the art of plywood construction, with the few added factors of improved adhesive that, while reducing some of our minor problems, do not touch the major problems.

These major problems are:

(1) The use of variable materials which are actually growing and, though seemingly exactly alike, are as unalike as two fingerprints.

(2) The use of controlled atmosphere in a huge factory space.

(3) The protection against the elements of both the inside and the outside of the product when assembled.

(4) The inability to hold the necessary tolerances in mass production with material which, hydroscopic as it is, has to be shipped from place to place.

(5) The limited material supplies that are actually available today for the fast-moving defense program and our inability to augment them during the next year to increase production 300 or 400 per cent.

The industry's probable material requirement for airframes during the next two years will exceed $300,000,000. Even 10 per cent of this would far exceed the optimum capacity of the country's resinous laminated wood equipment, based upon the recent government census. Therefore, this can only be considered for small units in isolated parts on the airplane.

The possible application of laminated wood to the present defense program is given in Table I under the heading "Plywood." This indicates the parts and assemblies that should be considered and represents a total of approximately 21 per cent of the airframe cost. While this is not a large portion in an emergency, it is worthy of careful investigation and would, in turn, increase available sub-contractors and skilled laborers if it can be properly utilized, particularly in the manufacture of training planes and allied equipment.

While none of the major plants is set up to accommodate any large portion of this work within its new buildings, there are available in subcontractor plants men of knowledge and experience who could carry it on. The great stumbling block to such a change is time. The industry has its designs jelled in aluminum alloy and it would require a year, perhaps two years, to redesign, build, test and sub-let such parts to reduce the aluminum alloy load. Maybe this should be done at once simply to have the extra facilities if they are required —certainly the country might be that much better prepared. This question will have to be answered in the near future, but no immediate steps are being taken to get forcefully behind the problem at the present time.

So much for plywood. Now what about plastics—the most important item in this article? This delayed consideration was for a real purpose, for while they are allied in general, the plywoods or impregnated woods, have on the whole the far greater possibility of application in the present defense program.

Plastics are definitely in the picture, but to a much smaller degree than might be supposed. Refer again to Table I—it will be seen that there are quite a number of items approved. These, however, represent only about five per cent of the total airframe cost and even then are much more questionable in their immediate application than the plywood. The reason for this is fundamental and is the lack of experience and service test background.

No manufacturer responsible for a definite delivery program will go into a new field and place orders for parts that may not fulfill the service requirements on the airplane he has contracted to produce. Before parts can be made in plastics the proper source of supply must be developed and the contractor must be assured of deliveries that will meet his schedules for, while the part may cost only a few dollars, the whole airplane may be held up if delivery of a single item does not pass requirements.

Therefore, before plastics can be accepted it is necessary to have experienced suppliers furnished with parts that meet government specifications and are capable of withstanding the hard usage based upon several years of service test. While there are a number of excellent suppliers doing just this at the present time, they do not offer a broad enough background of service experience to warrant the wide adop-

THIS observer's turret is molded of acrylate resin.

tion that the industry would like to see.

A very important additional limitation is one of plant equipment in large enough size to meet the bulk requirements in aircraft. Even if it is desired to manufacture doors, wing tips, etc., from plastics, the presses required to handle dies of such size under 3000 lb. per sq. in. of pressure are limited to less than the fingers on one hand and the experienced personnel to conduct such work is only now being trained to its new jobs.

It is necessary, however, to utilize what knowledge there is available and apply this material to small parts of secondary characteristic to relieve, insofar as possible, the load on aluminum alloy equipment.

Table II (which will be published next week) on plastic properties has been included, covering the compounds that are at present being used to a more or less degree by airframe designers. The data given are from a large chart prepared and published by *Modern Plastics*, and for reference and description of the various processes, tolerances and designs, the Boonton Molding Co.'s reference book on Plastics is recommended.

To be more specific, the use of the phenol formaldehyde compounds are for small parts such as trim tabs, light fixtures, chart boards, instrument panels, battery boxes, pulley and pulley guards, fairleads, knobs, cranks, etc.

The urea compounds are less used, being principally for clear laminated covers on instruction and name plates.

The methyl-methacrylate resins are perhaps the most spectacular as they cover the Plexiglas and Lucite field. These are transparent (90 to 92 per cent light transmission) and are used for molded pilot and gunner's enclosures and all secondary windows. Laminated plate glass is still used for windshields and bomber's window.

The cellulose compounds cover the more common pyroline sheet for port hole and window light, with the Bulyrate molded products coming into use with more recent developments.

There are few government specifications covering the plastic field as directly applicable to aircraft parts. This is due to lack of service experience and, therefore, the industry as a whole hesitates to take the full burden of responsibility for the use of any new material.

Any new material must also be considered from the cost point of view, and with the actual production of parts limited even under the defense program it is not always easy to justify the cost. The dies on even small parts are relatively expensive, and it is often necessary to accept a considerable increase in piece cost to get the part into service use in hope that the future will warrant the development of new materials and processes. There is, as well, the resulting saving in final cost of the part by the elimination of all machine work and the use of the part as purchased. Where attachment of parts on final assembly is required by riveting, this is apt to be very critical and no parts should be used where riveting is mandatory.

As an investigation of plastic application to production airplanes, a recent study indicates that out of 600 parts considered, 82 were recommended for consideration as plastic parts in competition with aluminum alloy castings, extrusions, pressings and screw machine processes. Of these, 34 were recommended as unquestionable, 20 were limited if riveted attachment was critical; the balance (28) were borderline cases to be determined by price and service use.

Ed. Note:—Next week the author presents data and observations on the role of corrosion resistant steels in aircraft construction.

A GUN turret molded of acrylate resin.

Flame Hardening With City Gas

—The selection and development of gas burners and mixing equipment. Determination of of maximum surface temperatures reached, and useful working range of various types of equipment.

By J. M. KRAPPE
School of Chemical and Metallurgical Engineering, Purdue University, Lafayette, Ind.

THE selection and development of gas burners and mixing equipment for flame hardening purposes opens a relatively new field for city gas utilization. This fact became more and more apparent to the Gas Engineering Laboratory, Purdue University, as investigations proceeded on some available mixing equipment and gas burners of both old and new design for the purpose of developing higher temperatures on flame heated surfaces.

Present work has been limited to a study of various types of gas burning equipment available for supplying mixtures of air and natural gas alone, and supplementary oxygen to gas burners for hardening steel in the open. Such mixing equipment as proportional mixers, blower mixers, and gas compressors have been worked with using nozzle mixing, tunnel type and flame retention burner heads. Maximum surface temperatures reached have been determined, and the useful working range for the various types of burners and equipment tested.

Surface Hardening Applications

A review of the conventional method for heating and quenching reveals the mechanism involved and the possible fields for surface hardening. In the conventional method of heating, the work is allowed to remain in the furnace for a period long enough to bring the center of the steel section practically up to the furnace temperature after which it is removed from the furnace and quenched. The furnace temperature is maintained slightly above the critical temperature for the type of steel being heated. In surface hardening operations, the steel is exposed to the heat source only long enough to heat the outer surface above the critical range. The time period for this heating process is relatively short and the depth of heat penetration varies from $\frac{1}{8}$ to $\frac{1}{4}$ in., depending on the depth of surface hardness desired. In open flame hardening a water jet is used to produce a rapid quench.

Ordinary carbon steels and some alloy steels are not fully hardened in heavy sections by the conventional method. As an example consider a carbon-manganese steel containing 0.45 per cent carbon and 0.9 per cent manganese, which has been uniformly heated above the critical temperature and quenched in water. A 0.5-in. round will show a hardness of 60 Rc on the surface ranging down to 54 at the center. A 5 in. round under the same conditions will show a surface hardness of 37 Rc and 25 Rc at the center of section atfer quenching. A study of the hardenability of various sizes and compositions of steel led to the development of steels giving more uniform hardness distribution across heavy sections so that exceptions to the above should be noted for these special steels.

The present field of application for surface hardening in furnaces or in the open may be summarized as follows:

(1) Surface hardening of steel in heavy section.

(2) Hardening of small areas without subjecting the entire piece to heat treatment. Typical examples would be: crankshaft bearings, piston pin bearings, pump shaft bearings and gear teeth.

(3) Surface hardening to avoid excessive distortion which may result from complete heating and quenching. It is claimed that straightening and grinding costs are reduced by this method.

(4) Surface hardening of articles which cannot be heated in a furnace due to their size and assembly. The surface hardening of runners on machine tools after assembly and machining would serve as a typical example.

Quenching Methods

It is the high velocity water jet with its rapid quench which results in the hard martensitic structure desired in flame hardening applications. Since the carbon content of the steels used up to the present time for flame hardening are in the range from 0.4 to 0.7 carbon[1], the steel is able to withstand a drastic water quench without checking or cracking. It is well known that steels of higher carbon contents require special handling to prevent checking on a drastic water quench. It is often possible to arrange a water quench so that the temperature of the work is brought down to only 500 deg. F. and then air cooled to room temperature. This is an old technique and was found by experience to improve conditions in immersed bath quenching. In other words it may be possible to handle higher carbon steels on flame hardening by careful control of the quench.

A typical top quenching temperature for a 0.7 per cent plain carbon steel would be 1500 deg. F. according to current practice in hardening from furnaces. Other steels require heating to higher temperatures before quenching. A typical stainless steel of the cutlery type is heated to 1850 deg. F. and quenched in oil, and certain high speed steels are heated to 2400 deg. F. followed by an oil or air quench.

Burners for Natural Gas

The maximum temperatures attained on a refractory brick ranged from 1700 deg. to 2100 deg. F. as indicated by an optical pyrometer. These are the equilibrium temperatures attained by allowing time enough for the surface of the refractory to be heated to the maximum temperature. The air-gas mixtures supplied to the burner head were adjusted to obtain a particular type of flame which showed the highest temperatures, namely, a flame having an inner cone as short and sharp as possible. It was found that if the refractory were placed at a position outside the tip of this inner cone, maximum surface temperatures were attained. If a closer placement of the burner with respect to the refractory were used, a cold spot was obtained at the center of the heated area due to the impingement of the inner cone.

The test results indicate that an enclosure around the flame is beneficial in raising the surface temperatures attained. In one case in which a "Sticktite" burner fired into an insulated tunnel 5½ in. long the indicated surface temperature was increased from 1750 deg. to 2100 deg. F.

In general, multiple port burner heads having uniformly sized ports throughout gave very satisfactory results both from the viewpoint of the surface temperature attained and of the uniformity of temperature of the heated area. As typical examples, the results obtained with burners No. 4 and No. 8 may be referred to in Table I. It should be noted that these burners were also equipped with a short tunnel around the flame which added its share to the increased surface temperature obtained. Also, these two burners were much less cumbersome than burner No. 2 which was equipped with a 5½ in. long insulated tunnel.

Some of the burners having flame retention ports around the main port developed heated areas having hot spots at the center. The temperatures given in Table I are those taken when pointing the pyrometer at the central hot spot.

[1] "Steels for Flame Hardening," Metals Handbook, 1936, p. 685, American Society for Metals.

TABLE I

Burners for Selective Heating With City Gas

Test Results Using Air-Natural Gas Mixtures from Blower Type Mixer

Burner No.	Type and Size of Burner	Area Heated, Diameter in Inches	Surface Temperature, Deg. F.	Burner Rating, B.t.u. Per Hr.	Remarks
1	Maxon Sticktite, (¾ in. I. P. S.)	3	1750	38,000	Sharp flame, distinct green colored inner cone. Area uniformly heated.
2	Maxon Sticktite, ¾ in. I. P. S.with tunnel	3	2100	43,900	With 5½ in. long insulated tunnel around flame, 2-in. pipe with 1½ in. asbestos insulation.
3	McKee Blast Head No. 70	2	1710	13,100	Area heated showed pattern of cold and hot spots.
4	McKee Lava Tip, 1½ in. I. P. S.	2	1980	23,300	Area uniformly heated.
5	McKee Ferro-Fix ¾ in. I. P. S.	2	1700	35,600	Flame sharp, blue tinged with green. Area uniformly heated.
6	McKee "No-Blow" Blast Tip, ¾ in. I. P. S.	2	1740	17,000	Hot spot at center due to one long flame at center of group of small flames.
7	McKee Ribbon Tip ⅜ in. I. P. S.	..	.....	.....	Sharp flame could not be obtained. Soft flame did not burn on ports.
8	Special Design, Gas Laboratory	2	2000	33,400	Very even heating.

TABLE II

Test Results Using Natural Gas-Air Burner No. 8

Test No.	Burner Input, B.t.u. Per Hr.	Surface Temperature, Deg. F.	Line Pressures, Lb. per Sq. In. Air	Gas	Mixture Pressure In. Water	Primary Air-Gas Ratio	Remarks
1	15,900	1850°	—1.0 in. Water	1.9 lb.		14:1	Air taken from atmosphere at inlet of gas compressor.
2	25,600	1870°	6.2 lb.	4.0 lb.		8.9:1	Use of excess amount of air causes a whistling noise.
3	27,300	1920°	6.3 lb.	4.0 lb.	2.9	8:1	
4	27,800	1940°	6.3 lb.	4.0 lb		7.8:1	
5	33,400	2000°	0.0 lb.	6.0 in. Water		6:1	No. 0 Maxon-Premix blower mixer. Maximum mixture pressure 2 in.
6	36,700	2025°	7.4 lb.	4.0 lb.	2.9	10:1	
7	39,800	2130°	7.0 lb.	4.0 lb.	2.7	8.9:1	Tunnel length, 2 in.
8	42,600	2130°	8.8 lb.	4.0 lb.	3.4	9.7:1	Tunnel length, 3 in.

This hot spot might not be considered disadvantageous if a rotating shaft were being heated in a lathe. However, if a stationary strip were being heated by passing the burner parallel with the work, higher temperatures would be developed in the center portion of the work.

Effect of Gas Input

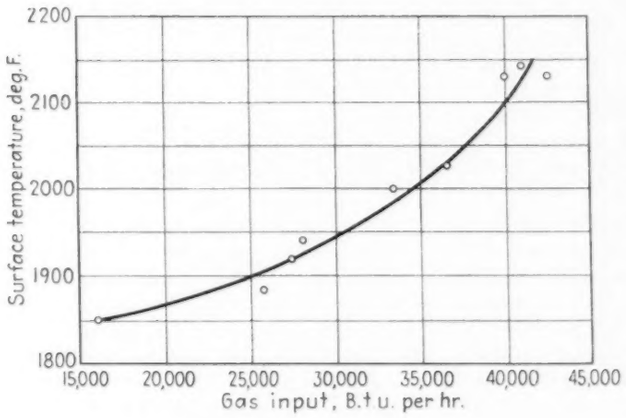
In general, higher surface temperatures are developed by increasing the gas input to air-gas burners. Such a result would seem obvious but it is mentioned because some operators fail to set the gas input high enough for effective surface heating. This is especially true of burners that are equipped with tunnels. When such a burner is first started up it will take only one-third of the maximum gas input. With the tunnel cold, the flame tends to lift from the ports and burn at the open end of the tunnel. It is necessary to start up with a small gas input and to adjust the air supply for small flames which will heat the tunnel walls. The gas-air mixture input may then be gradually increased up to a maximum as the tunnel develops a visible red heat.

The increased surface temperatures obtained by increasing the gas input to burner No. 8 are shown graphically in Fig. 1. It was possible to raise the surface temperatures obtained from 1850 deg. F. to 2100 deg. F. by increasing the gas input. A limit was reached at an input of 40 cu. ft. of natural gas per hour when the flames again lifted from the ports resulting in a cooling action on the tunnel walls. In each run the primary air to gas ratio was set at about nine to one in order to develop the short, sharp flames having the highest temperature.

The maximum mixture pressures developed by the blower mixer were less than 2 in. water column as measured immediately in back of the burner head. The higher mixture pressures shown in Table II were developed by mixing compressed air and pressure gas in a simple mixing tee. A gas compressor developing four pounds pressure at the outlet was used to obtain the higher gas inputs.

Surface Temperature

With the optical pyrometer used, it is felt that the temperatures read corresponded to black body conditions since readings could be obtained by sighting on a small depression made in the refractory surface. With the radiation pyrometer a large field was necessarily sighted upon and it was not



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LEFT

FIG. 1 — Relation between gas input and surface temperature using natural gas burner No. 8.

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RIGHT

FIG. 2 — Calibration of radiation pyrometer. F. & F. pyrometer used as standard.

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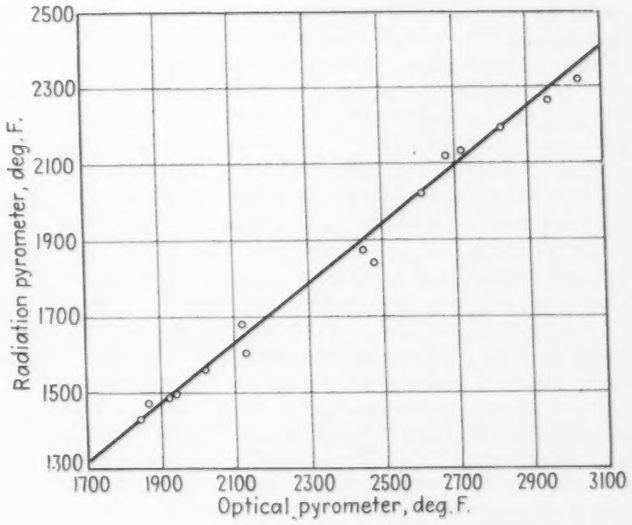


possible to obtain true black body conditions. Actually, the surface temperatures as read with a radiation pyrometer were lower than those indicated by the optical pyrometer. Fig. 2 shows the comparative indicated temperatures read by sighting the two pyrometers on the refractory brick during the various runs made. The results indicate that the emissivity coefficient of the flat refractory surface was 0.78.

The test results showed that air-gas burners generate sufficient temperature for flame hardening operations on steels having carbon contents up to 0.7 per cent. The quenching temperature of carbon steels varies somewhat depending on the composition and type of structure required, but a minimum quenching temperature for a 0.4 per cent plain carbon steel is given as 1475 deg. F. by the iron-carbon equilibrium diagram. Several of the burners tested showed surface temperatures in excess of this temperature. Hence, with a suitable burner design and application it should be possible to heat the surface of the steel to its proper quenching temperature. Increased production could be obtained by setting up a manifold of two or more burners for the heating operation. Thus, in its application a steel strip to be hardened could be attached to the bed of the lathe and the burner manifold fastened to the moving carriage. It is felt that two or three burners followed by a quenching water stream should give effective surface hardening at a reasonable production speed.

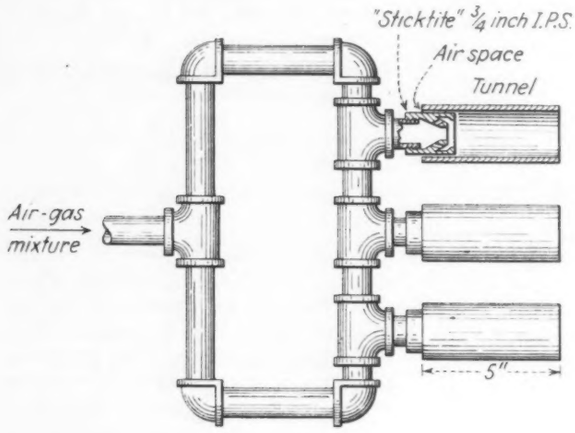


FIG. 3—Manifolded air-gas burners.

A similar multiple burner arrangement may also be applied to the surface hardening of a circular shaft. Very even heating could be obtained by rotating the shaft at the same time that the cluster of burners around the circumference of the shaft was being moved parallel to the shaft.

A typical multiple burner manifold having a natural gas input of 130 cu. ft. per hr. is shown in Fig. 3.

Ed. Note: — Next week the author will continue with data on use of oxygen, and test results with air, gas and oxygen mixtures.

Cast Iron Polished With Graphite Flakes Preserved

ACCORDING to a detailed report recently issued by the Iron and Steel Institute (British), with H. Morrogh as the author, a polishing technique has been developed for gray cast irons, whereby the graphite flakes can be obtained perfectly preserved and smoothly polished. The polishing medium used is either Diamantine or magnesium oxide. The method owes its success to the correct application of a repeated polishing and etching operation.

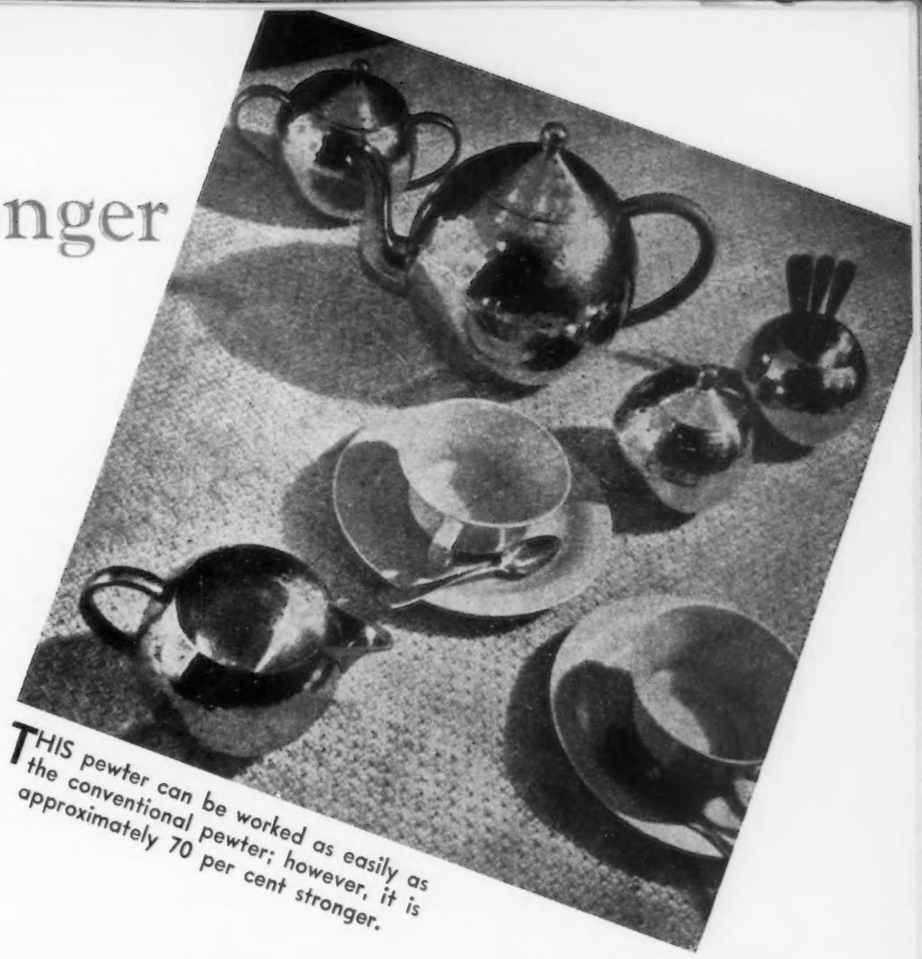
With specimens prepared in this manner, it is possible to examine the internal structure of the graphite flakes and temper carbon nodules. Secondary graphite is shown to be deposited either on the existing eutectic graphite flakes or in a Widmanstätten pattern. Graphite flakes show complicated internal structures, which are illustrated micrographically using polarized light. "Inclusions" are also shown intimately associated with graphite flakes.

The ideal achieved is a smoothly polished metallic matrix free from surface distortions and smoothly polished graphite flakes with no burnishing or flowing of the metallic matrix over the graphite flakes. Only with specimens prepared in this way can any accurate idea be obtained of the size, shape and internal structure of graphite flakes. The process described enables the complete preservation of the graphite flakes and the polishing operation, if correctly adhered to, produces specimens perfectly prepared for photomicrography.

The polishing procedure given has the advantage that it is a comparatively rapid method of specimen preparation and the stages are quite simple. It is rather difficult to give any accurate times for the preparation of specimens, but as a rough guide it can be said that it should be possible to prepare a specimen of a cross-section from a 0.875-in. diameter test bar in 15 min., that is including cutting, grinding, rubbing down, and polishing and etching. The actual time required for specimen preparation by this method is to some extent a function of the number of times the specimen is etched and repolished, and this again depends on the structure of the specimen and on the perfection required.

For the routine visual examination of cast irons, it is frequently unnecessary to have the graphite flakes perfectly prepared. In these cases only a rough idea of the general structure is needed and the number of polishing and etching operations can be reduced to a minimum. No specimen should have less than three polishings and etchings, and in only a very few cases should it be necessary to polish and etch more than ten times to obtain a perfectly prepared specimen. The repeated etching and polishing operation not only improves the appearance of the graphite structure, but also gives a better finish to the metallic matrix.

New and Stronger Pewter



THIS pewter can be worked as easily as the conventional pewter; however, it is approximately 70 per cent stronger.

IN the course of the systematic study of the tin-rich alloys, which forms an important part of the researches of the International Tin Research Institute, several alloys have been examined which are exceedingly interesting as possible improvements on the alloys now used for pewterware, according to W. T. Pell-Walpole. Two of these new alloys, described herein, contain 90 per cent of tin, and have all the merits of malleability and attractive sheen associated with pewter, but both are substantially stronger.

It is, of course, not difficult to make an intrinsically harder pewter, but such hardness would be a material obstacle to the spinning and other traditional fabricating operations. The new alloys, however, when in the cast condition, are about as soft as normal pewter and are as easily cold rolled to sheet without intermediate annealing. The blanks are readily spun, and tooling, cutting, soldering, etc., can be carried out in the traditional manner; but when the finished articles are given a simple heat treatment they develop about 70 per cent or 80 per cent more strength, and this strength is permanently retained under the conditions of service usual for pewter.

The improved pewters could prove particularly useful for tea or coffee pots, hotwater jugs, and so on. Such articles, even when made from the best pewter hitherto available, have had a tendency gradually to distort, and in the course of time some have become unserviceable. The increased resistance to this type of deterioration is closely bound up with the ultimate strength and with the creep strength of the alloys, and particularly, with the high proportion of strength which the improved pewters retain at the temperature of boiling water. The substantially improved properties now available will be apparent from the figures given in the table, where hardness measurements have been used as the simplest measure of relative mechanical strengths.

The simpler alloy "A" is pure tin plus 9 per cent antimony; the still stronger alloy "B" contains 9 per cent antimony plus 0.5 per cent of cadmium, the balance being tin. The preferred heat treatments for hardening these alloys are as follows:

		Hardness (Vickers)			
		As-Rolled	Fully Hardened		
		At 68	At 68	At 212	At 284
Alloy		Deg. F.	Deg. F.	Deg. F.	Deg. F.
"A"	Sb 9 %				
	Sn 91 %	15	27	14	11
"B"	Sb 9 %				
	Cd ½%				
	Sn 90½%	17	30	18	14
Normal commercial pewter		15–20	15–20	9–12	6–8

Alloy "A": Anneal for 8 to 16 hr. at 437 deg. F. ± 9 deg. F., quench in cold water then temper harden for 24 to 36 hr. at 230 deg. F. ± 9 deg. F. This alloy will not respond to the heat treatment if any less drastic method of quenching is employed; if the temperature of hardening is lowered, the time required is unduly prolonged, and if raised, the hardening may be uncontrollably rapid and resoftening might occur.

Alloy "B": Anneal for 4 to 8 hr. at 437 deg. F. ± 9 deg. F., quench in cold water, then temper harden for 16 to 30 hr. at 302 deg. F. ± 9 deg. F. Less drastic methods of quenching can be used, but subsequent treatment does not then develop quite the maximum hardness.

In both alloys grain size is an important factor influencing the extent and permanence of the hardness obtained, but with the recommended heat treatments the optimum grain size is obtainable (200 to 400 grains per sq. cm. for alloy "A" and 100 to 200 grains per sq. cm. for alloy "B"). To insure the unobstructed use of these alloys the heat treatment methods have been made the subject of a patent application by the Tin Research Institute, and permission to use the processes will be granted on application without any charge, or license fees.

Trial melts have been made on a semi-industrial scale and the metals have been rolled, spun and fabricated in a workshop normally engaged in pewter manufacture with entirely satisfactory results; and as the technical control is simple it seems likely that the new alloys may be widely adopted where strong and durable pewter is called for.

Heat Treatment With

EFFECT OF TIME AND TEMPERATURE: The temperature has a dual effect upon the results obtained by treating in the cyanide bath. As in all carburizing processes, due to the greater mobility of carbon with the increase in temperature, a more rapid penetration is obtained by increasing the temperature of the bath. Fig. 4 shows the increasing rate of penetration of S.A.E. 1020 steel with correspondingly increasing temperatures.

The temperature also affects the composition of the case resulting from the use of the cyanide bath. At lower temperatures the carbon diffusion is slow and, in general, the bath at the lower temperatures will produce cases that are hypereutectoid at the extreme surface. At the lower temperatures the nitrogen concentration is relatively high and as the carburizing temperatures are increased, the nitrogen becomes of relatively less concentration than the carbon. Table IV shows the relation of carbon and nitrogen penetration in respect to temperature.

As should be expected, time is a direct function of the depth of case. As the carburizing time is increased at any given temperature with any given analysis of bath, the depth of penetration is correspondingly increased. Fig. 5 is a series of micrographs of S.A.E. 1020 steel that have been treated for times from 1 to 6 hr., and Table V tabulates the nitrogen and carbon penetration in these same five samples.

The samples in Table IV were obtained by heating 1 hr. at the various temperatures and permitted to cool slowly surrounded by a small quantity of the bath in which they had been heated, in order that they might be machinable.

The percentage of carbon and nitrogen shown are the increment over the core composition. The point at which the percentage is shown was taken as follows: A cut 0.004 in. deep was taken on the radius of the bar and analyzed. It was assumed that the average analysis of each cut would be the composition at the midpoint of the cut.

The composition of the bath was in all cases 30 per cent NaCN. The baths operated at the temperatures of 1300 deg. F. to 1550 deg. F. analyzed 8 per cent NaCNO; the bath at 1600 deg. F. — 5.3 per cent NaCNO; the bath at 1650 deg. F. — 4 per cent NaCNO, and the bath at 1700 deg. F.—3.5 per cent NaCNO. It is extremely difficult to maintain a very high cyanide content at the higher temperatures due to the rapid oxidation of the cyanate to carbonate.

The more rapid diffusion at the four higher temperatures of the carbon towards the center of the bar will be readily noted.

Effect of the Steel

Steels of different compositions react differently to the cyanide bath, although the foregoing will apply to all steels in general. The grain size of the steels directly in-

TABLE IV

Analysis of Case as Affected by Temperature

Temperature	Increment at a Depth of 0.002 in.		0.006 in.		0.010 in.		0.014 in.	
Deg. F.	C	N	C	N	C	N	C	N
1300	0.26	0.83	0.01	0.18	0.00	0.10	0.00	0.08
1400	0.67	0.78	0.21	0.15	0.02	0.03	0.00	0.02
1450	0.75	0.60	0.36	0.21	0.08	0.06	0.02	0.04
1500	0.84	0.52	0.38	0.23	0.15	0.04	0.02	0.02
1550	0.56	0.40	0.53	0.24	0.29	0.07	0.08	0.02
1600	0.43	0.43	0.41	0.26	0.28	0.09	0.15	0.03
1650	0.36	0.50	0.36	0.25	0.22	0.10	0.15	0.02
1700	0.35	0.43	0.35	0.14	0.24	0.09	0.19	0.02

TABLE V

Structure of S.A.E. 1020 Steel Treated in a 30 Per Cent Bath at 1525 Deg. F. and Water Quenched

(Composition of the Case as Obtained by the Analysis of a Series of Cuts Each 0.004 in. on the Radius)

Time,	Cut Number 1		2		3		4		6	
Hr.	% C	% N	% C	% N	% C	% N	% C	% N	% C	% N
1	0.62	0.82	1.18	0.50	1.31	0.43	1.53	0.42	1.86	0.50
2	0.47	0.40	0.70	0.34	0.84	0.28	0.86	0.30	0.86	0.32
3	0.32	0.10	0.58	0.19	0.71	0.21	0.78	0.19	0.81	0.18
4	0.27	0.03	0.52	0.07	0.54	0.10	0.61	0.17	0.63	0.14
5	0.22	0.01	0.40	0.03	0.38	0.05	0.49	0.07	0.51	0.08
6	0.20	0.01	0.27	0.02	0.28	0.03	0.29	0.04	0.37	0.04
7			0.22	0.01	0.22	0.02	0.23	0.02	0.30	0.03
8			0.20		0.19	0.01	0.20	0.02	0.27	0.02
9								0.01	0.22	0.01
10									0.20	0.01

TABLE VI

Influence of the Composition of the Steel on the Case

(Amount of case hardening)

Depth,	SAE 1020		SAE 2315		SAE 4615		SAE 1120		SAE 1112	
In.	% C	% N	% C	% N	% C	% N	% C	% N	% C	% N
0.002	0.28	1.09	0.31	0.89	0.33	0.92	0.26	0.47	0.34	0.50
0.006	0.23	0.48	0.29	0.36	0.19	0.25	0.15	0.21	0.22	0.22
0.010	0.12	0.11	0.14	0.09	0.05	0.10	0.05	0.09	0.06	0.09
0.014	0.01	0.04	0.05	0.07	0.03	0.09	0.00	0.05	0.03	0.05

Salt Baths

By LLOYD E. RAYMOND
Fairfield, Conn.

—Continuation of data presented last week. Herein, attention is directed toward effect of temperature and time, effect of steel being treated, and the effect of activators.

fluence the rate of the carburizing, the coarser grain being the faster carburizing. When it is necessary to control the depth of case closely, particularly when forgings are being treated, a preliminary normalizing treatment is recommended to prevent the production of erratic results.

Steels that are heavily banded tend to carburize in a somewhat spotty manner when treated at the lower temperatures due to the tendency of the heavy ferrite bands to stop off the carburizing, producing shallow cases where the heavy bands are parallel to the surface of the metal, and soft spots where the bands are perpendicular to the surface of the steel. When treated at temperatures at which the ferrite has become completely austenitic, no appreciable difficulty will be encountered from the bands. Fig. 6 shows the effect of heavy ferrite bands in free machining steel treated in the cyanide bath. Table VI shows some carburizing gradients for five commonly used steels.

In Table VI the temperature of the bath is 1500 deg. F. Time of immersion is 1 hr., and bath analyzed 30 per cent NaCN, 5.3 per cent NaCNO. The samples were permitted to cool slowly surrounded by a small quantity of the bath so that they could be machined.

A series of four cuts was taken each 0.004 in. deep on the radius, and the turnings from each cut were analyzed. It was assumed that the average analysis of each cut would be the midpoint of the cut, and the analysis was thus reported. The percentages reported in Table VI are the increase in carbon and nitrogen over the analysis of the core, thereby being the amount of the carburizing.

Activated Carburizing Baths

There have been developed, in the past several years, modified cyanide baths which have been introduced under several trade names and designations. In general these baths are referred to as activated or accelerated baths. The development of these baths has been aided by the wish in many heat treating establishments of procuring a case on low-carbon steel that is of much lower nitrogen concentration than is obtained by the use of the standard cyanide bath.

The fact that at the higher temperatures much above 1550 deg. F., the cyanide baths are subject to rapid deterioration with subsequent fuming which, although not of a poisonous nature, is objectionable and highly corrosive to machinery that may be present in the heat treating department or adjacent thereto, has also promoted these modified baths.

The "normal" cyanide bath is usually started with a mixture of 45 per cent sodium cyanide, the other 55 per cent being sodium carbonates and chlorides. However, as the mixture is heated some of the cyanide is oxidized to cyanate and then to carbonate and the bath, due to replacement of dragout, shortly becomes a mixture of sodi-

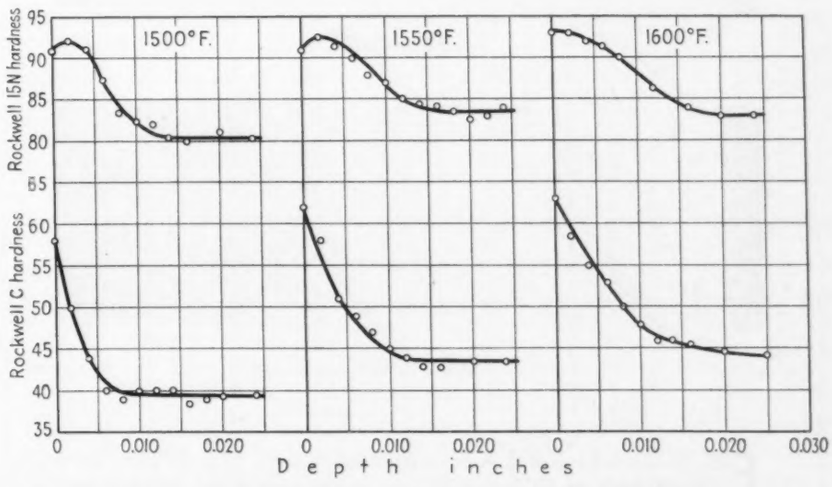
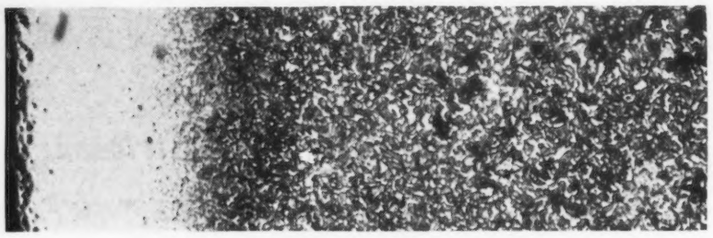
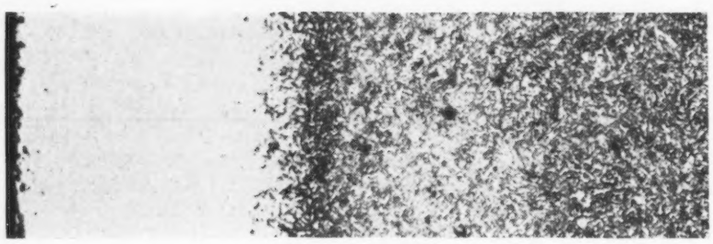


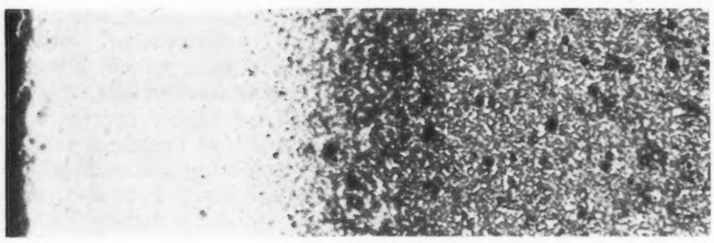
FIG. 4—Increasing rate of penetration with correspondingly increasing temperature. S.A.E. X1020 steel treated in 30 per cent NaCl at the temperatures indicated and water quenched.



ONE HOUR

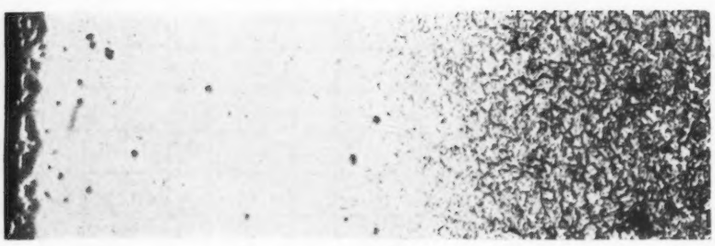


TWO HOURS



THREE HOURS

FOUR HOURS



SIX HOURS

FIG. 5—Structure of S.A.E. 1020 steel treated in a 30 per cent cyanide bath at 1525 deg. F. and water quenched. Work done in a 100-lb. laboratory furnace. Nital etch and at 100 diameters.

um cyanide, cyanate and carbonate with but a trace of chlorides being left.

The "activated" baths are, in many cases quite complex analyses, probably due to the desire of the producer to discourage the customer from analyzing the bath and producing his own composition at a somewhat lower cost.

For the most part these carburizing baths contain barium or calcium compounds in conjunction with sodium cyanide. Most of them operate with a cover of a carbonaceous material—frequently a foundry coke—to which some other ingredients may have been added to discourage the heat treater from manufacturing his own, or natural flake graphite which is the preferable cover. This cover prevents high heat losses and undue oxidation of the cyanide as well as reducing the amount of fuming.

The majority of these baths are replenished with the same composition with which they are made up, while a few are "sweetened" with a special mixture usually quite high in cyanide content.

These "activated" baths are usually operated at temperatures higher than it is economical to operate the cyanide bath and hourly production is thereby stepped up. They produce cases that are very low in nitrogen, and the hardness of the resultant case depends entirely upon the carbon concentration in the steel.

Fig. 7 shows the results obtained in a bath which analyzed:

NaCN	=	26 per cent
NaCNO	=	2 per cent
Na_2CO_3	=	20 per cent
$BaCO_3$	=	28 per cent
NaCl	=	26 per cent

This bath was prepared by melting a mixture composed of:

NaCN	=	48 per cent
$BaCO_3$	=	28 per cent
NaCl	=	24 per cent

The bath is operated with a flake graphite covering, the only replenishment being a mixture of the original composition. This bath will operate perfectly satisfactorily when the concentration of the sodium cyanide has dropped to as low as 10 per cent, or even lower.

The salt adhering to the work, especially after it has been oil quenched, is difficult to wash due to its limited solubility. No car-

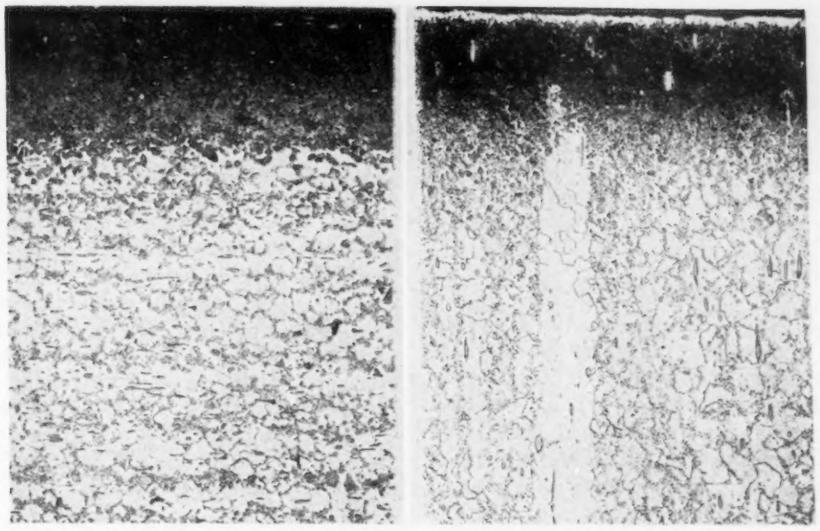


FIG. 6—Effect of heavy ferrite bands in S.A.E. X1112 steel. Treated 50 min. at 1550 deg. F. in 33 per cent NaCN bath; NaCNO, 5.2 per cent. Nital etch and at 100 diameters.

bonates or phosphates should be employed in the washing material as they will precipitate insolubles. A hot water spray washer is most satisfactory.

Table VII lists the analysis of the case of a sample of S.A.E. 1020 steel treated for 2 hr. in a standard liquid carburizing salt bath. The percentage of carbon and nitrogen shown in the table is the increment over the core composition. The point at which the composition is reported was reached as follows: A cut 0.004 in. on the radius was taken and analyzed. It was assumed that the average composition of the cut was identical with that at the center of the cut, and is reported as the analysis at that point.

Operation of the Baths

THE CYANIDE BATH:

The cyanide bath may be made up by using the standard 45 per cent cyanide chloride mixture. Additions to this may be made by adding the 96 per cent cyanide or the 75 per cent cyanide mixture. If the dragout is extremely great due to the large surface of the material being treated and short cycles, the 75 per cent mixture will suffice, but if the time of treatment is rather long—averaging 45 min. or longer—it will be found preferable to use the 96 per cent cyanide to keep the bath up to standard.

If no 45 per cent mixture is available, the bath may be made up by adding soda ash or sodium chloride to 96 per cent cyanide. In replenishing the bath it is poor practice to add the replacement but once a day as the analysis of the bath will be quite non-uniform in this case. The best practice is to add 1 to 2 per cent of the weight of the bath every hour during the operating day. When the cyanide content of the bath tends to drop, it can be restored by holding the bath at 1300 deg. F. for an extended period of time.

As the effectiveness of the cyanide bath depends to a very great extent on the continual oxidation of sodium cyanide to sodium cyanate, no hood should be placed around the cyanide furnace that will exclude free flow of plenty of air over the top of the bath; for the oxygen in the air is the sole

° ° °

FIG. 7—Results obtained in an activated bath with 1/4-in. samples of S.A.E. 1112 steel. This bath will operate perfectly satisfactorily when the concentration of the sodium cyanide has dropped to as low as 10 per cent, or even lower.

° ° °

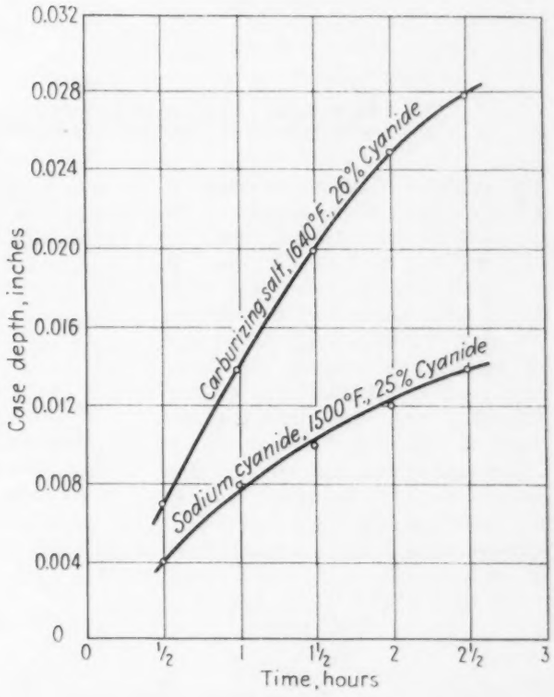


TABLE VII

Analysis of Case of S.A.E. 1020 Steel Carburized for 2 Hr. at 1700 Deg. F.

Depth,	Amount of Carburizing		Depth,	Amount of Carburizing	
In.	% C	% N	In.	% C	% N
0.002	0.83	0.05	0.026	0.21	0.02
0.006	0.86	0.04	0.030	0.14	0.00
0.010	0.72	0.03	0.034	0.09	
0.014	0.56	0.03	0.038	0.05	
0.018	0.47	0.02	0.042	0.03	
0.022	0.35	0.02	0.046	0.00	

means available for the oxidation of the cyanide.

The formation of black scum will reduce the amount of cyanate present in the cyanide bath as the scum is nearly pure carbon which at the operating temperatures is a highly effective reducing agent. When this black scum starts to form, the amount of cyanate present in the bath immediately drops. This scum is most prevalent when a new alloy pot is put into use. It can be eliminated by successive additions of laundry or corn starch to the top of the scumming bath. The starch will cause an immediate increase in the amount of scum and cause it to coagulate when it may be readily skimmed off. After a few treatments with starch the bath will cease to scum.

Malleable iron is best treated by heating at 1350 deg. F., followed by quenching. Steel is best treated at temperatures from 1400 deg. F. to 1550 deg. F., the lower temperatures when it is desired to have very shallow cases relatively high in nitrogen. Cast iron may have its wear resistance increased by quenching from 1500 deg. F. This is particularly effective with the molybdenum and chromium bearing cast irons.

THE CARBURIZING BATHS:

No definite instructions can be laid out for the operation of these baths. It is well to follow the supplier's instructions. Some of these baths are replenished with the same mixture that is used in making up a new bath, others with a special mixture, and still another may be kept up to standard by adding three-quarters of one per cent of the weight of the bath every hour when operating at 1700 deg. F.

In operating all baths which are used for carburizing, whether they be the standard cyanide bath or the higher temperature carburizing baths, it should be borne in mind that the work must be placed in the bath so that it will heat uniformly. If the work is heavily nested in a basket, the outer part will be at temperature for quite a period of time before the center of the work, and will therefore be carburized much more deeply than will the work in the center of the basket. When extreme uniformity is desired, it is advisable to have the parts being treated on wires or fixtures so that heating will take place uniformly and rapidly.

Ed. Note: — Next week the author will discuss salt baths for hardening and tempering, and types of equipment in general use.

Steel Blackened With Black Magic

BLACK MAGIC, a low temperature black bath for steel, is being sold by the Mitchell-Bradford Chemical Co., Bridgeport, Conn. It is a fused chemical salt which when mixed with water and brought to 300 deg. F. boils vigorously, and all steel parts (except stainless) immersed at this heat are quickly colored a rich blue-black through chemical reaction.

The cost of blacking steel by this process is said to be under ½c. per lb., including labor and fuel.

Requirements are a welded sheet steel tank equipped with burners, immersion heaters, or steam coil; an alkali wash; hot rinse; cold rinse; and finish in either hot oil or wax. Parts may be strung on wires, hung on racks or placed in baskets. The tanks should be of a size to meet production requirements.

Originally a gun coloring medium, this process has been adapted to all sorts of steel fabrications. It is said to be a permanent finish that will not fade, peel, chip or rub off, and is an excellent bond for paint, enamel and lacquer.

It is used to penetrate motor and other bearings to prevent scuffing. Screw makers are bluing their products. A large wire mill furnishes black wire to its customers, and certain makers of arms have adopted it. Electric fans, mechanical toys, tire chains, hand tools, spark plugs, hooks and eyes, spinning rings, pocket knives, taps and dies, springs of all kinds, electric fittings and trunk hardware are also being treated in this manner.

Capacitors Pay for Themselves

CAPACITORS have cut power costs upwards of $315 per month and raised the operating power factor from 69 per cent to 95 per cent at the National Acme Co., Cleveland machine tool builder. Based on present operation, the 720 kva of Westinghouse capacitors will completely pay for themselves in 18 months.

Previously the plant's low power factor, caused by large numbers of induction motors in operation under partial load, was responsible for higher than average monthly power demand charges. The low power factor also caused poor voltage regulation at ends of power feeders, resulting at times in poor motor performance and feeder heating.

Motor performance has noticeably improved since the capacitors were installed because voltage conditions at motor ends of the feeders are much steadier. Elimination of useless lagging, or wattless current, has done away with current overloads on the feeders, and has made extra feeder capacity available for use when needed.

Because floor space is valuable, the capacitors were installed up in the roof trusses on simple angle-iron frames. They are distributed in banks, one bank at each subpanel feeding a low power factor motor group. They are connected in the power circuit continuously.

Instrument Facilitates

X-Raying Circumferential Seams

By ROBERT C. WOODS
Physicist, Bell Aircraft Corp., Buffalo, N. Y.

IN the radiography of welded circumferential seams in cylindrical vessels and tubes, various methods are now in use to insure the correct placement of X-ray films relative to the source of radiation. Although it may find other applications, an instrument devised by the author is excellent for the following conditions: in Fig. 1, B is a circumferential weld in tank T, X is the X-ray tube target located so that a line from X to the tank center O is parallel to ground. F is a film holder or cassette.

From the diagram it is quite evident that line XL is shorter than XM. Since X-rays, like other electromagnetic disturbances, decrease as the square of the distance from their source, it follows that the radiation intensity at M will be less than at L and, as a result, film F will receive less exposure at M. Moreover, due to the angle at which it traverses the weld at M, the X-ray beam will have a greater quantity of metal to penetrate at that point than on line XO, thus still further reducing its intensity.

For these reasons, production of a good radiograph under such circumstances requires the center of the film to be placed at L.

In considering this problem, it must be kept in mind that pressure vessels and similar structures afford little or no outside view to any worker inside, and handy reference points for measurement are often few and far between. At present, one method for effecting good film placement is to mark off film-lengths on the inside wall, starting at some given point—for example a longitudinal seam. From the exterior side of the same seam, the outside circumference must then be marked off, sufficient overlap being allowed to compensate for the variation between inside and outside circumferences. While this system is fairly rapid, it has the disadvantage of a progressive inaccuracy, because each time the tank is rotated to bring a fresh, unexamined length of weld into the X-ray view, it is rarely turned through an identical angle. This is especially true if the turning is done by motor, since whatever error in braking occurs is bound to be cumulative. If the turning is done by human power, the results will be very unpredictable.

Therefore, even if the mark and turn method is accurate at the start, so many variables are involved during the X-ray of a complete weld they make some sort of intermittent check very desirable.

Referring to Fig. 2, A is a combination spirit level fitted with protractor, such as is commonly sold by machine tool supply houses. This device is fastened to a rigid metal or wood base which, in turn, is joined at exact right angles to another rectangular support C. It has been found most convenient to make C out of wood so that the shafts of the small rubber tire castors, or wheels, DD, can be made extensible to care for various arcs.

This instrument can be placed against the outside of the weld and lined up to show the declination from horizontal, if any, of the line XO which represents the shortest X-ray path from the target X to the tank wall.

After a reading has been taken to determine elevation—a quantity which will remain constant over the entire weld—the instrument may be taken inside the tank, protractor set at the proper division on the scale, and the first film position marked off. This makes tedious reference point measurements unnecessary right from the start. Thereafter, the device can be used to set each film or only when a check seems advisable, depending upon the preference of the radiographer.

The dimensions of the instrument itself may vary and depend to some extent on the size of level-protractor available. A convenient size for use in vessels with diameters of 4 ft. or over is such that C is 12 x 2.5 in. and B, 9 x 2 in. With this device it has been found possible to locate points with an accuracy of 0.5 deg., even taking into account the fact that some of the measurements made by eye cannot be absolutely precise.

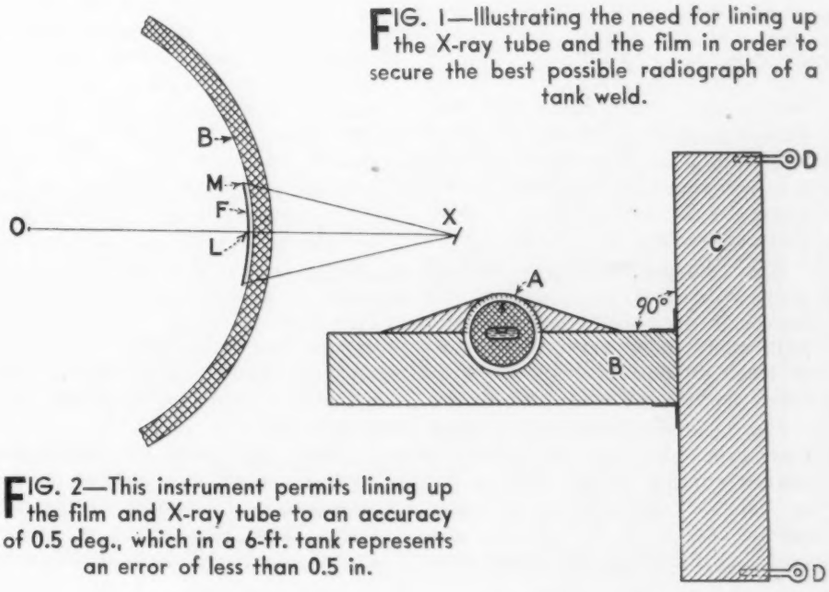


FIG. 1—Illustrating the need for lining up the X-ray tube and the film in order to secure the best possible radiograph of a tank weld.

FIG. 2—This instrument permits lining up the film and X-ray tube to an accuracy of 0.5 deg., which in a 6-ft. tank represents an error of less than 0.5 in.

41 Lessons in ARC WELDING

—Continuation of a series of lessons to enable beginners to master the fundamentals of bare and shielded arc welding techniques.

LESSON No. 28: *Object is to make a single vee butt weld between 3/8 in. plates by using flux coated electrodes.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 3 x 6 x 3/8-in. steel plates, with a 30 deg. bevel along one end of each plate, and 5/32 in. diameter Crucible Weld "AP" electrodes.

INSTRUCTIONS: The production of horizontal butt welds with position type flux coated electrodes is generally not recommended in practice because the welding speeds obtained are considerably less than those obtained with down-hand type electrodes. Position type electrodes are sometimes used however, consequently it is desirable to study their characteristics.

The reduced fluidity of the deposit with this type of electrode makes it desirable to use a joint with an included angle of bevel of at least 60 deg. and to use relatively narrow weaving procedures.

The bead deposited with a position type electrode will have a convex surface rather than a flat or concave surface, consequently special care must be taken to prevent slag inclusions and obtain complete fusion at the edges of the beads when depositing a second bead on top.

Although the amount of slag produced by this type of electrode is relatively light it is desirable to remove it completely before depositing a second layer because the rapid solidifying properties of the deposit tend to prevent excessive puddling which aids in floating the slag to the surface.

PROCEDURE: Set the polarity reversing switch on reverse polarity and adjust the welding current to about 160 amp. Tack weld the plates together with a 1/8-in. free space, as shown in Fig. 48, and place them in a horizontal position on the welding table.

Weld the plates together by using four passes, as shown in Fig. 48. Clean the slag and spatter from each layer before depositing the next. Be careful to obtain complete fusion at all times. Inspect each deposit for uniformity of appearance and flaws. Try to improve the appearance and quality as the weld progresses.

After the joint is completed, have the instructor inspect it for appearance. Following the instructor's inspection, make a nicked groove on the top layer at the center of the weld and fracture the specimen. The exposed fracture should show sound uniform weld metal free from gas pockets, slag inclusions, poor fusion and incomplete penetration.

Repeat this exercise until a satisfactory butt weld of this design can be made.

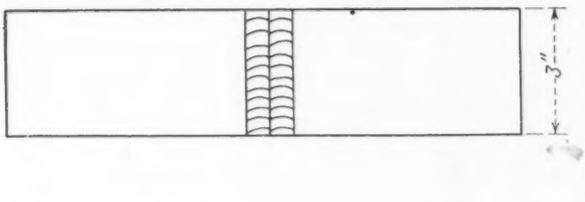
LESSON No. 29: *Object is to make a 1/4-in. horizontal fillet weld by using flux coated position type electrodes.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 6 x 8 x 1/4-in. steel plates, and 5/32 in. diameter Crucible Weld "AP" electrodes.

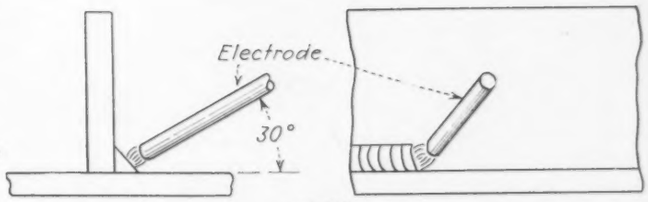
INSTRUCTIONS: A horizontal fillet weld is a fillet weld made between two plates, one of which is in the horizontal position. This type of weld is easily made with a coated electrode designed for welding in all positions because the slagging characteristics are such that little difficulty is encountered from undercut on the vertical plate, excessive roll of the weld or entrapped slag. In order to produce a weld of the proper shape, it is desirable to point the electrode backward toward the weld and at an angle of about 30 deg. with the horizontal, as shown in Fig. 49. Moderate welding currents and a short arc are recommended.

The size of a fillet weld that can be made in a single pass will depend upon the diameter of the electrode, the thickness of the plates being welded and the rate of advance. The maximum size single pass welds that should be made with a given diameter of electrode are as follows: 1/8-in. electrode, 1/4-in. weld; 5/32-in. electrode, 1/4-in. weld; 3/16-in. electrode, 5/16-in. weld.

Excessive weaving is not recommended in making horizontal fillet welds. For the smaller size welds a continuous uniform rate of advance is recommended. For the larger size, single pass welds a small weave similar to that recommended for bare type electrodes (Lesson No. 11) is recommended.

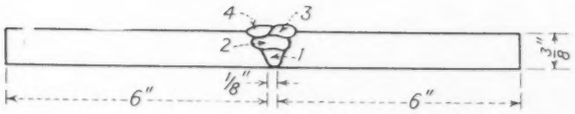
A fillet weld made with an all position type of flux coated electrode will have a convex shape and a definite surface ripple because of the rapid solidification characteristics necessary with this type of electrode.





ABOVE

FIG. 49—Method of pointing electrode for horizontal fillet weld.



LEFT

FIG. 48—Procedure for making a single vee butt weld between 3/8-in. plates by using flux coated electrodes.

PROCEDURE: Set the polarity reversing switch on reverse polarity, adjust the welding current to about 150 amp., tack weld two 1/4-in. plates at right-angles to each other to form a tee joint and securely ground them to the welding table.

Weld the plates together with a 1/4-in. fillet weld, as shown in Fig. 50, by using a single pass. Adjust the rate of advance so that the weld is the proper size and take special care to prevent undercutting and poor fusion.

Fracture the finished weld and inspect for good fusion, complete penetration, slag inclusions and gas holes. Repeat until satisfactory weld of uniform appearance can be obtained.

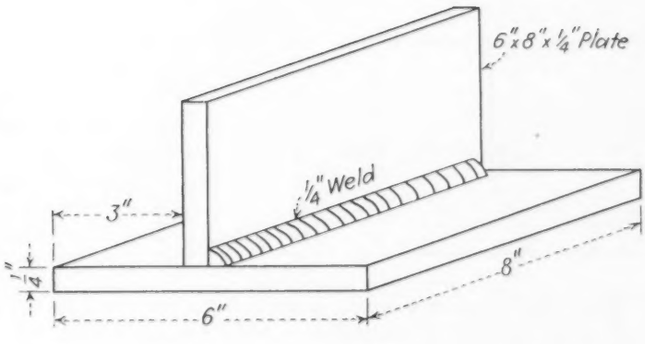
LESSON No. 30: *Object is to make a 3/8-in. horizontal fillet weld by using flux coated position type electrodes.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 6 x 8 x 3/8-in. steel plates, and 3/16 in. diameter Crucible Weld "AP" electrodes.

INSTRUCTIONS: The production of a 3/8-in. horizontal fillet weld with position type flux coated electrodes varies from that of a 1/4-in. horizontal fillet weld (Lesson No. 29) primarily in the number of passes used. A 3/8-in. fillet is a little too large to make a single pass unless excessive weaving is used, and in such cases a poorly shaped weld and undercut is usually obtained. As a result, when making a 3/8-in. horizontal fillet with "AP" type electrodes more than one pass is used.

When making a 3/8-in. fillet weld with coated electrodes with more than one pass, two procedures may be used. One procedure consists of using three string beads (Fig. 51-a), and the second procedure consists of using one string bead and a weaving cover bead (Fig. 51-b). The string bead procedure is recommended because it makes a higher quality weld, has less tendency to undercut, and produces a more uniform shaped fillet. As a result only the string bead procedure will be studied.

When making a weld with string beads the sequence in which the beads are deposited is often important. When using Crucible Weld "AP" electrodes, beads 2 and 3 may be deposited, as shown in Fig. 51-a, or the order may be reversed. By depositing bead No. 2 at the top of the weld a more uniform appearance will be obtained.

When using electrodes with a heavier and more fluid slag, it is generally recommended to deposit the second bead at the bottom of

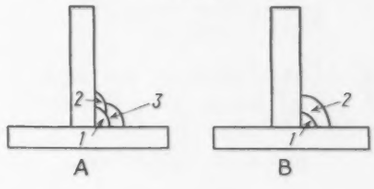


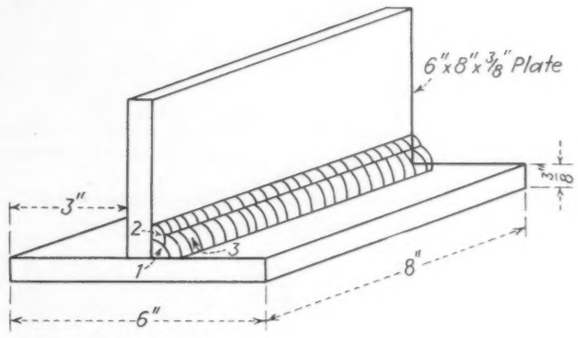
LEFT

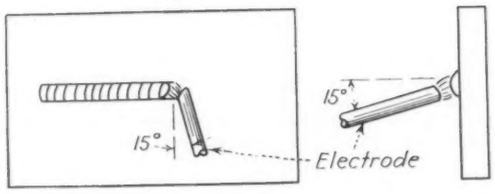
FIG. 50—Method of making a 1/4-in. horzontal fillet weld by using flux coated position type electrodes.

BELOW

FIG. 51—These two procedures may be used to make a 3/8-in. fillet weld with coated electrodes.







ABOVE

FIG. 53—Method of pointing electrode when depositing bead in a horizontal plane.

LEFT

FIG. 52—Method of joining plates with a 3/8-in. fillet weld by using three passes.

the weld (reverse the order of beads 2 and 3 in Fig. 51-a) in order to prevent entrapping slag in the weld.

PROCEDURE: Set the polarity reversing switch on reverse polarity, adjust the welding current to about 180 amp., tack weld two 3/8-in. plates at right-angles to each other to form a tee joint and securely ground them to the welding table.

Weld the plates together with a 3/8-in. fillet weld, as shown in Fig. 52, by using three passes. Be sure to deposit the passes in the sequence shown. Take special care to make a weld of the proper size and shape.

Fracture the finished weld and inspect for good fusion, complete penetration, slag inclusions, and gas holes. Repeat until a satisfactory weld can be made.

LESSON No. 31: *Object is to deposit beads on a horizontal surface by using flux coated position type electrodes.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plate 1/4 in. or heavier, and 5/32 in. diameter Crucible Weld "AP" electrodes.

INSTRUCTIONS: The deposition of weld metal on a vertical surface with a flux coated electrode is generally more difficult than it is with a bare type electrode because of the increased fluidity of the deposited metal and the additional slag present. When using a properly designed electrode, however, little trouble should be experienced.

When depositing a bead in a horizontal plane, the electrode should be pointed backward toward the deposit at an angle of about 15 deg., as shown in Fig. 53. A short arc is required and the welding current is about the same as that required for down hand welding. Weaving is not recommended when depositing horizontal beads on a vertical surface.

When depositing a vertical bead on a vertical surface welding uphill and/or downhill may be used depending upon the type of electrode. Electrodes that produce a relatively heavy and fluid slag are suitable for uphill welding only. The slag from this type of electrode will run ahead of the arc when welding downhill and produce an unsatisfactory deposit. Electrodes of the Crucible Weld "AP" type are suitable for welding either uphill or downhill and no trouble will be experienced from the slag running ahead of the arc.

When welding uphill the electrode should be pointed upward at an angle of about 15 deg. A welding current somewhat lower than that used for down hand welding is recommended. Weaving may be accomplished by passing the electrode across the plate surface and giving a slight upward motion at the ends of the weave. When weaving, the welding current should be

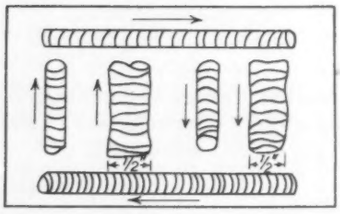


FIG. 54—Test plate for deposition of beads on a horizontal surface by using flux coated position type electrodes.

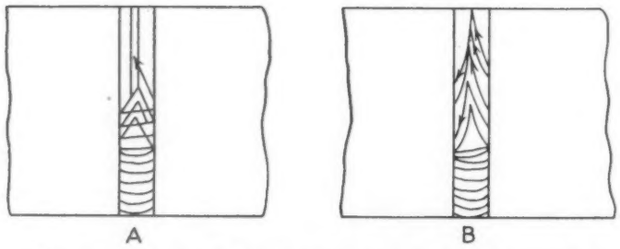


FIG. 55—Several weaving procedures which may be used to make a vertical butt weld between 1/4-in. plates by using flux coated electrodes.

slightly lower than when depositing string beads.

When welding downhill the electrode should be pointed upward at an angle of about 15 deg. A short arc is required and the welding current should be slightly higher than is the case when welding uphill. Weaving when welding downhill is relatively difficult, consequently it is not done in most cases. If weaving is used it should be very narrow and with a rapid motion in order to prevent the molten metal and slag from running ahead of the arc.

The rate of advance of downhill welding is relatively rapid, consequently such a bead is very small.

PROCEDURE: Set the polarity reversing switch on reverse polarity, adjust the welding current to about 150 amp. and tack weld a ¼-in. plate in the vertical position.

(1) Deposit a horizontal bead by welding from left to right. (If the welding current is not correct, adjust it for better results.) Repeat this exercise and practice stopping and starting until a smooth, uniform bead can be made.

(2) Repeat exercise (1) by welding from right to left.

(3) Lower the welding current to about 125 amp. and deposit a bead by welding uphill. Practice stopping and continuing the bead.

(4) Make a deposit by welding uphill and weaving to make a weld about ½ in. wide.

(5) Increase the current to about 150 amp. and deposit a bead by welding downhill. Note the high speed of travel necessary in order to prevent the slag and molten metal from running ahead of the arc.

(6) Weld downhill and attempt to weave. Note the troubles encountered.

(7) After the above exercises have been completed, make a test plate as shown in Fig. 54.

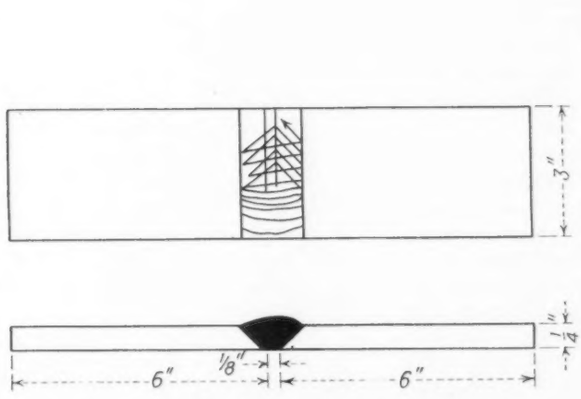


FIG. 56—Method of welding plates by using a single layer triangular weave.

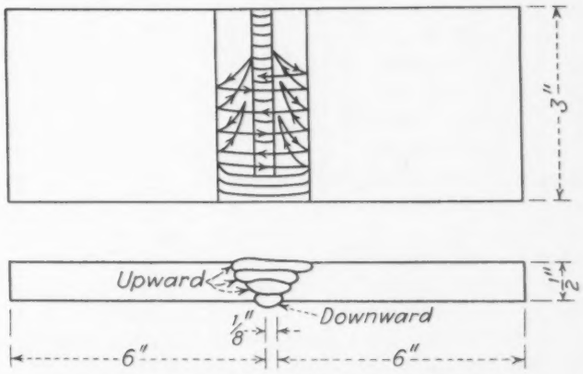


FIG. 57—Method of making a vertical butt weld between ½-in. plates by using flux coated electrodes.

LESSON No. 32: *Object is to make a vertical butt weld between ¼-in. plates by using flux coated electrodes.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 3 x 6 x ¼-in. steel plates with a 45-deg. bevel on one end of each, and 5/32-in. diameter Crucible Weld "AP" welding electrodes.

INSTRUCTIONS: It was pointed out in Lesson 31 that vertical welds could be deposited by welding uphill or downhill. If welds are made by welding downhill, more passes are required and the result is more distortion, slightly higher tensile strength, lower ductility and more porosity. For this reason uphill welding is generally recommended. Downhill welding is seldom used except on very thin gage material or on the first pass of a heavy weld.

Vertical butt welds between ¼-in. plates may be made in one pass or two passes. If two layers are used the first layer should be welded downward and the second layer welded upward. This lesson deals with the single layer procedure and the welding should be done by welding upward.

The plates should be separated about ⅛ in. at the bottom to insure complete penetration. A number of weaving procedures can be used and the type preferred is dependent somewhat upon the welder's skill. One procedure consists of a simple triangular weave similar to that shown in Fig. 55-a. In cases where trouble is experienced from undercutting or excessive local heating at the weld, a whip procedure as shown in Fig. 55-b may be used. On the upward motion of the electrode the arc is drawn out, thereby allowing the deposit to cool slightly. The upward whipping motion of the electrode should extend about 1 to 2 in. above the deposit.

Proper control of the arc is essential to insure complete penetration and fusion and to eliminate undercut at the edges of the weld. A uniform weave and rate of advance along the joint are necessary for the production of a uniform high quality weld. A short arc is required when depositing metal to the weld.

PROCEDURE: Set the polarity reversing switch on reverse polarity,

adjust the welding current to about 125 amp. and tack weld two ¼-in. plates together to form a 90-deg. single vee butt joint. Mount the tack welded plates in the vertical position and securely ground them to the welding table.

Weld the plates together by using the single layer triangular weave, as shown in Fig. 56. Be sure to hold a short arc. Try to improve the appearance as the weld progresses.

After the weld is completed, have the instructor inspect it for surface appearance and undercut. Following the instructor's inspection, nick the weld and fracture the joint. The exposed fracture should show sound metal free from gas pockets, slag inclusions, poor fusion and incomplete penetration.

Repeat this exercise until a satisfactory weld can be made.

LESSON No. 33: *Object is to make a vertical butt weld between ½-in. plates by using flux coated electrodes.* Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 3 x 6 x ½-in. steel plates with a 45-deg. bevel on one end of each, and 5/32-in. and 3/16-in. diameter Crucible Weld "AP" welding electrodes.

INSTRUCTIONS: When making vertical butt welds in plates of sufficient thickness to require more than one layer of weld metal to complete the joint, it is often desirable to deposit the first pass by welding downward and the remaining passes by welding upward. This is the procedure that is to be studied in this lesson.

As mentioned in Lesson 31, downward welding requires more current for a given size electrode than upward welding. As a result, if a smaller diameter electrode is used on the downward pass than on the upward passes, the same current setting on the welding machine will be found satisfactory. The elimination of the necessity of changing the setting of the welding machine between passes will be found very helpful in many cases.

The application of a downward pass for the first bead in a joint has the advantage of quickly sealing the joint and preventing burning through the thin edges of the plates at the root. The deposition of the second pass will almost completely remelt and fuse the first pass, thereby insuring a sound joint the full thickness of the plate.

The weaving procedure recommended on the upward passes consists of passing the electrode across the face of the weld and applying a slight upward and outward motion at the plate surfaces in order to obtain complete fusion and to push the molten metal into any undercut portion that might have been obtained.

Proper control of the arc is essential to insure complete penetration and fusion and to prevent undercutting at the edges of the weld. A uniform weave and rate of advance are important in obtaining a weld of uniform quality and appearance. A short arc is required at all times.

PROCEDURE: Set the polarity reversing switch on reverse polarity, adjust the welding current to about 140 amp. and tack weld two ½-in. plates together to form a 90-deg. single vee butt joint. Mount the tack welded plates in the vertical position and securely ground them to the welding table.

Weld the plates together by depositing the first layer downward with 5/32-in. diameter electrodes and the remaining layers upward with 3/16-in. diameter electrodes, as shown in Fig. 57. Be sure to hold a short arc. Try to improve the appearance as the weld progresses.

After the weld is completed, have the instructor inspect it for surface appearance and undercut. Following the instructor's inspection, nick the weld and fracture the joint. The exposed fracture should show sound metal free from gas pockets, slag inclusions, poor fusion and incomplete penetration.

Repeat this exercise until a satisfactory weld can be made.

Dies Lubricated With Colloidal Graphite

TO increase the number of operations between successive redressing operations on extrusion dies, the Revere Copper & Brass Inc. Detroit plant is using Dag colloidal graphite as a lubricant in making extruded architectural and other shapes of aluminum alloys.

Extended tests have shown that by using this form of lubricant it is possible to increase the number of pushes by an average of 20 per cent. Also, the improved surface will reduce considerably the number of rejections of extruded products.

The method of applying the graphite to the dies is very simple. Each time the dies are removed for redressing, they are coated with a graphite dispersion, using an ordinary spray gun. The dispersion is made up from the Acheson colloidal graphite concentrate, thinned with distillate of 200 second viscosity. This is suitable for dies that are still warm from use. When dies are cold, the dispersion is thinned further with carbon tetrachloride.

The sections produced by the extrusion process range from various architectural shapes, such as window frames, sills, angles, T's and Z's, to thin ribbed and corrugated forms suitable for moldings and cover strips. Use of the colloidal graphite has proved of greatest importance with the thinner sections where the decorative value of the product may require a consistently smooth, bright finish.

Nitriding Offsets Notch Weakness

SEVERAL characteristics of nitriding which are of considerable value to engineers, but which are seldom mentioned in articles on the subject, were pointed out by N. P. Inglis, of I.C.I. Ltd., Billingham, England, in a recent issue of the Wild-Barfield *Heat Treating Journal.*

It is well appreciated that the presence of notches, screw threads, keyways, etc., greatly weaken the strength of metal parts, particularly when such parts are subjected to alternating or repeated stresses. Thus, when a plain, unnotched bar of alloy steel was tested under alternating stress, it was found that the material would withstand at least 20 million reversals of plus or minus 32 tons per sq. in. When, however, the same material was tested with a notch cut in it, fracture occurred after only about 1 million reversals of plus or minus 10 tons per sq. in. Thus, for such a material, when notched, in order to ensure a reasonably long life, the stress would have to be kept below plus or minus 6 tons per sq. in. These results are illustrated graphically in Fig. 1. If, however, the steel sample is nitrided *after cutting the notch,* the fatigue strength is unimpaired by the presence of the notch. This point is shown very clearly by the curves in Fig. 1. The top curve shows that for all practical purposes the same results relative to fatigue strength are obtained—using the same alloy steel—when notched and then nitrided and when nitrided and un-notched.

It is also worthy of note that these figures are all higher than those obtained on a standard fatigue sample when un-notched and not nitrided. The bottom curve shows most clearly the effect of the notch, when the steel has not been nitrided.

Thus, nitrided steel has the very great practical advantage of being immune from the weakening effect of notches, quite apart from any advantages which might be conferred by the very hard surface.

Corrosion Fatigue

It is now well known that the simultaneous influence of fatigue, i. e., alternating or repetitive stresses, and corrosion, is extremely damaging to most metals. The curves shown in Fig 2 illustrate the effect of the simultaneous action of alternating stresses plus River Tees water on Nitralloy steel in the nitrided and un-nitrided condition. The un-nitrided steel, shown by the lower curve in Fig. 2, behaves in a very similar manner to most other steels in that its corrosion-fatigue is extremely low. On the other hand, the nitrided steel, shown by the upper curve in Fig. 2, has excellent corrosion-fatigue resistance in river water, the corrosion-fatigue limit being about two-thirds of the normal value to be expected for such a steel when tested in air. This is an extremely high ratio as compared with many other steels.

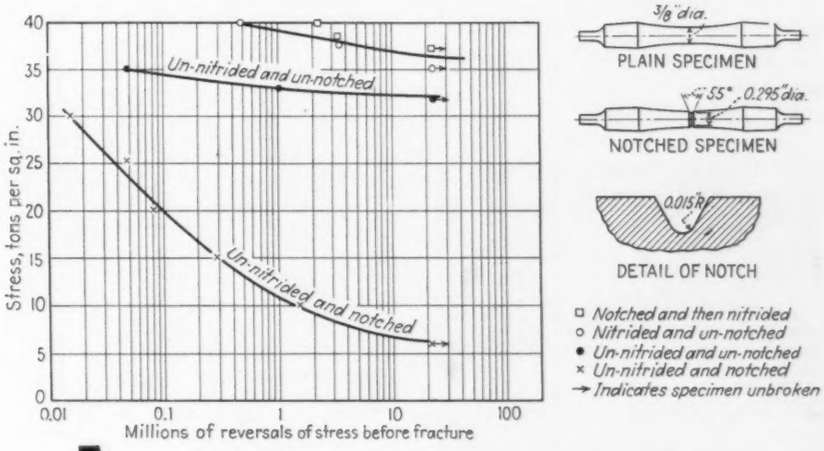


FIG. 1—Fatigue tests on Nitralloy steel. Courtesy I.C.I. Ltd.

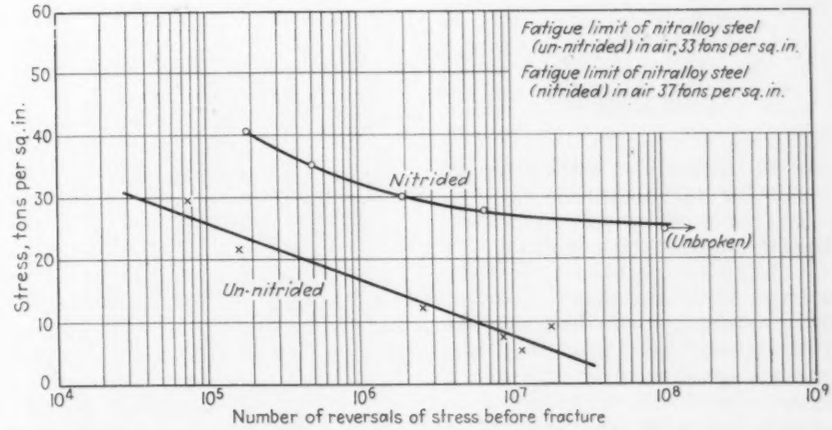

Fatigue limit of nitralloy steel (un-nitrided) in air, 33 tons per sq. in.
Fatigue limit of nitralloy steel (nitrided) in air 37 tons per sq. in.
Stress, tons per sq. in.
Number of reversals of stress before fracture
Nitrided
(Unbroken)
Un-nitrided

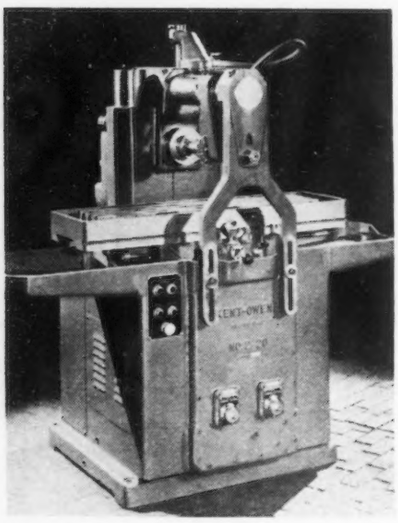
FIG. 2—Fatigue tests on Nitralloy steel in Tees river water. Fatigue limit of Nitralloy steel (un-notched) in air = 33 tons per sq. in.; fatigue limit of Nitralloy steel (nitrided) in air = 37 tons per sq. in. Courtesy I.C.I., Ltd.

New Equipment . . .

Machine Tools

New developments in milling machines, in lathes, in grinders, attachments, drills, tapping machines and auxiliary equipment are here discussed.

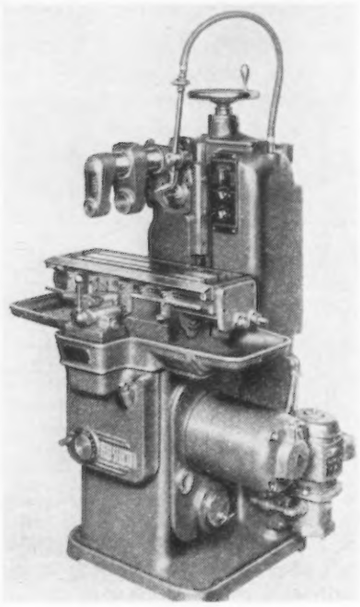
FULLY automatic cycle is featured by the No. 2-20 milling machine produced by *Kent-Owens Machine Co., Toledo.* The table can be fed or rapid traversed in either direction, automatically shifted from rapid traverse to feed in either direction with independent adjustment of the feed rate. It is possible to perform one operation at one end of the table and an entirely different one at the other end. Each direction of table travel has a separate feed rate control dial. Three spindle speed ranges are available: on the standard model a range from 64 to 860 r.p.m., other



models can be had with either 32 to 428 or 96 to 1284 r.p.m. The head, mounted on two cylindrical ground steel posts, eliminates any possibility of overhang or cocking action. Hydraulic pump and spindle are driven by two readily accessible motors. Specifications of this machine are: table size 42 x 12 in., table travel 20 in., table surface to spindle center 13 in. maximum, 4 in. minimum, infinitely adjustable feed range from ¾ to 38 in. per min.

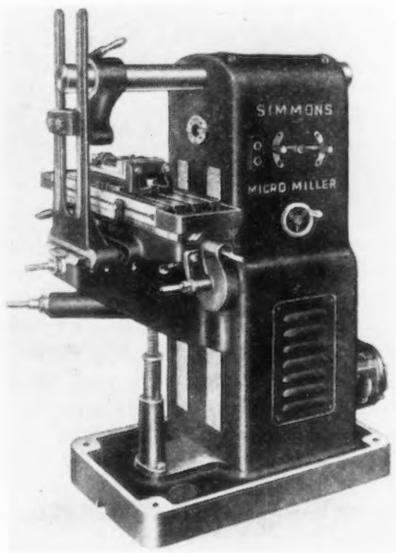
Small Miller

RECENTLY the *Sunstrand Machine Tool Co.*, Rockford, Ill., brought out two new and smaller No. 00 Rigidmil machines with a ¾ hp. spindle motor for high efficiency in milling of small parts with power or hand feed. The power feed machine—as illustrated—has a hydraulically actuated table, making possible a wider range of automatically controlled cycles including two way cycles and skip feed. Climb or conventional milling can be done either separately or in combination. Table is adjustable to a maximum stroke of 8 and a rapid traverse of 400 in. per min. Two feed ranges are available, one from ½ to 37 and the other from 1¼ to 66 in. per min. A wide range of spindle-speeds makes the ratio between high and low speeds 42½ to 1. Heads are available in two models, A with speeds from 57 to 2415 r.p.m. and B from 85 to 3600 r.p.m. Four sets of gears supply 16 possible speed changes. The independent motor insures the delivery of the full power at the spindle nose. A separate motor drives the hydraulic unit. The hand feed type machine is made up of the same basic unit and can be converted to power feed.



Milling Machine

PRODUCTION of the No. A-1 Micro-Miller is announced by the *Simmons Machine Tool Co.*, Albany, N. Y. This milling machine is especially suited for the

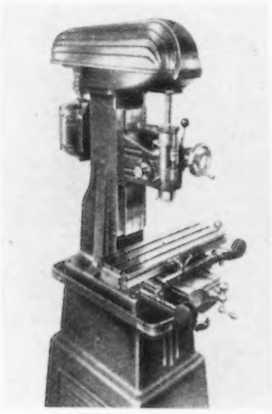


rapid working of small parts for firearms and airplanes, etc. It features the Simmons Micro-speed drive which, mounted inside the column, provides a range of spindle speeds from 38 to 500 r.p.m. at the turn of a handwheel. Range of feeds lies between 34 in. longitudinally, 8 in. across, and 18 in. vertically. Table measures 27 x 8 in. and feed per revolution of spindle ranges from 0.007 to 0.100 in.

Head for Horizontal Miller

ANNOUNCEMENT of the addition of a new vertical head for use with the Vernon No. 0

horizontal mill makes this machine a highly versatile unit. On this miller the new head can be used freely at any angle and in any plane. The spindle of the attachment has a No. 7 B&S taper and is driven through compound bevel gears carried in the head, which swivels in a plane parallel to the



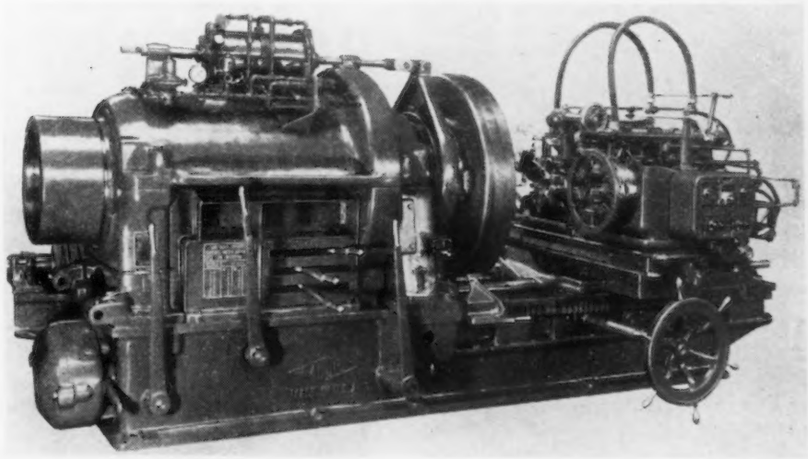
axis of the shaft. Designed to speed production work, the unit is quickly installed by removing the overarm of the machine. Tools are held by a draw-in collet. The Vernon line of horizontal millers is produced by the *Machinery Mfg. Co.*, 1915 East 51st Street, Vernon, Los Angeles.

Slotting Head

UNIVERSAL slotting head that can be used on all types of milling machines for precision work as the cutting of keyways, templets, splines, internal gears, etc., is announced by the Special Machine Division of the *Experimental Tool & Die Co.*, 12605 Greiner Avenue, Detroit. The stroke of the ram is adjustable from 0 to 4 in. and adjustments may be quickly and accurately made. The head is equipped with a ¼ hp. motor with four speed changes, speeds ranging from 50 to 250 or from 100 to 580 strokes per min. Preloaded Timken bearings are used throughout and the gears are hardened and ground. Overall length is 18 in., width 8 in., depth 12 in. and the head comes complete with pulleys, motor, belt and mounting adaptor for whatever miller specified.

Bomb Turning and Threading

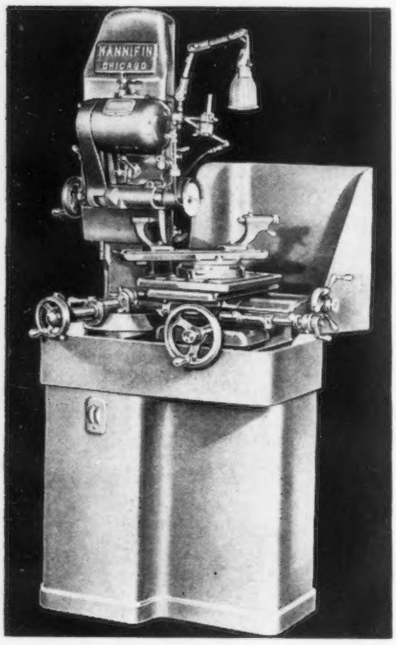
A MACHINE for finishing the tail end of bombs at one chucking has been designed by the *Landis Machine Co.*, Waynesboro, Pa. Three tool units are provided at the carriage and cross slide to perform the required operations. One tool unit, consisting of a tool head with four tangential type cutters and attached to a hydraulically controlled slide, turns, faces and chamfers the end of the bomb. A second tool unit has a hydraulically controlled slide with an adjustable six blade cutter head for finishing the bore, and an auxiliary hand-operated tool slide for machining the angular face and undercutting on the body of the bomb and the adjacent recess. The third tool unit, fixed to the cross slide, comprises a Landis 40 AX Landmatic die head which is especially designed for cutting fine pitch threads on large diameters. A leadscrew mechanism propels the carriage along the ways of the machine and assures accuracy of the thread. All movements of the tool slides as well as those of the cross slide are hydraulically controlled with circuits arranged with interlocks to assure correct operating sequences. The cross slide is hydraulically locked into position on the carriage when any one of the tools slides is in action. Controls are conveniently centralized at the front of the machine, permitting full observation of operation. This unit is equipped with a variable speed motor driven headstock and eight speed ranges are provided by the gear transmission. A pneumatically operated chuck is attached to the front end of the machine spindle for centering and driving the bomb. The process is automatic from the moment the bomb is pushed through the bore of the spindle until the operation is finished. Only the recessing tool is fed by hand to a stop before engaging in the operation of finishing the angular surface.



Tool Grinder

UNIVERSAL precision tool grinder No. 5 made by *Hanni-fin Mfg. Co.*, 621-631, South Kolmar Avenue, Chicago, embodies a variety of special features which adapt it for rapid and highly accurate production of modern cutting tools. The precision-built spindle for dry or wet grinding is driven by a ¾ hp. motor at speeds from 3600 to 35,000 r.p.m. under load. This permits the use of different size wheels from ⅛ to 4 in. diameter, which are mounted on adapters for greater accuracy and

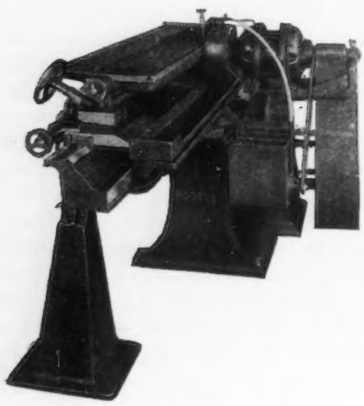
speed of changing. A built-in coolant pump is driven by a separate 1/15 hp. motor. Table working surface measures 9 x 13 in. and three slots are provided for the mounting of special attachments



and fixtures. This makes possible the grinding of a wide range of intricate precision tools and parts.

Armor Plate Grinder

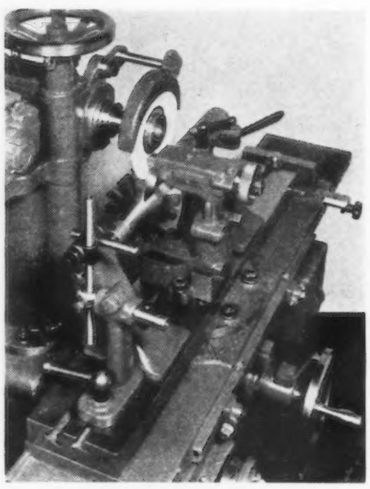
INCREASED production is claimed to be possible using the Rogers type NT super duty knife and armor plate grinder. It is capable of heavy cuts where these are required and at the same time maintains precision accuracy and provides a fine finish under continuous operation. The solid heavy duty base, cast as a single unit, supports the table and knife bar on extra wide, surface V and flat ways which take up their own wear. Table and knife bar speed is



standard at 28 ft. per min. and the drive is by 1¾ in. steel rack and hardened steel pinion from the transmission unit. Also hydraulic table traverse is available. Cross feed of grinding head is adjustable automatically or manually and a 5 or 7.5 hp. motor drives it through a belt and a friction clutch. The heavy knife bar has two working surfaces, one for heavy, one for thin blades. Grinding can be performed either away from or towards the edge. The grinder is also built with a special platen for sizing light armor plate, 1 in. thick, 36 in. wide and 100 in. long. Standard equipment includes a self-contained water supply system with a motor driven pump. The machine is supplied in four standard sizes from 70 to 132 in., larger sizes can also be supplied by *Samuel C. Rogers & Co.*, 191-205 Dutton Avenue, Buffalo.

Cutter Sharpening Attachment

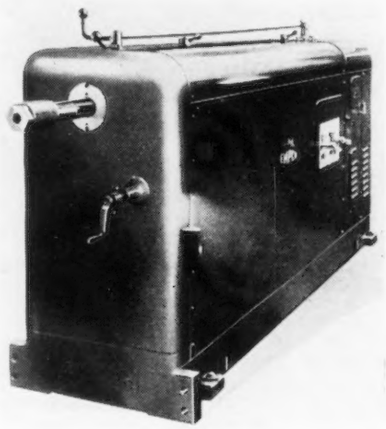
RAPID and accurate sharpening of formed cutters can be effected with two new attachments brought out by *Brown & Sharpe Mfg. Co.*, Providence, as No. 10 in-



feed and through-feed models. Tools 2 to 6½ in. diameter with straight teeth are mounted horizontally in the in-feed model and vertically in the through-feed type. Cutter is fed against the 6-in dish wheel which is set parallel to the table. The attachment consists of an adjustable tooth rest assembly and a rugged support for the cutter. The removal of stock is regulated by thumbscrews which advance or retract the cutter tooth. Three cutter arbors are furnished with the equipment to take cutters of ⅞, 1 and 1¼ in. bore.

Honing Machine

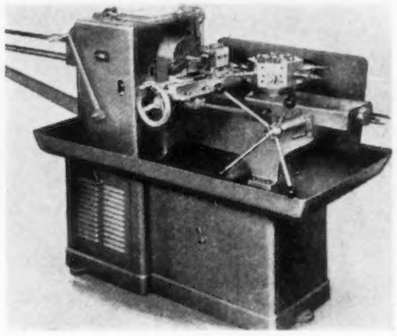
HORIZONTAL type honing machine has just been announced as a new product of the *Enterprise Machine Parts Corp.*, Detroit. This Empco machine, with a precision range of within 0.0002 in., can accommodate work demanding a



stroke up to 57 in. Special models can be had for longer strokes. The horizontal position permits a more efficient action of the coolant. Any type of work in sizes from 2 to 12 in. diameter can be worked and perfectly round, straight, mirror finish holes are produced. Honing tools of any make can be accommodated. Apart from the withdrawal of the honing tool the machine is operated mechanically. Spindle speed is variable from 50 to 200 r.p.m. Changes can be made from one job to another without trouble or extra time. In this ruggedly constructed machine of 110 in. length, all parts are readily accessible.

Improvements on New Lathe

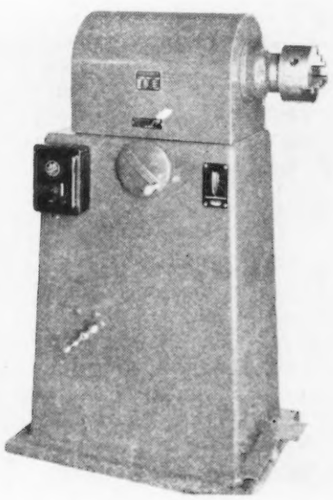
FOR their No. 601 Rapiduction lathe, discussed in THE IRON AGE on Dec. 5, 1940, page 52, the *Oster Mfg. Co.*, Cleveland, announce several improvements. A hexagonal turret is now available,



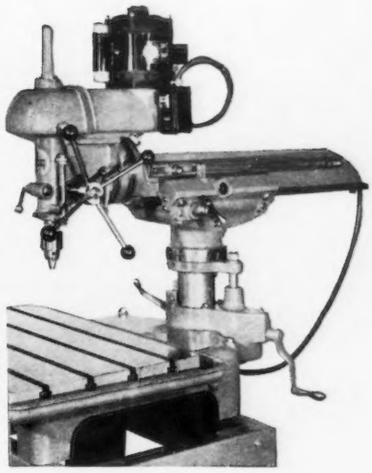
hand operated and indexed. Saddle stops are automatically synchronized with the revolution of the turret. The radial thrust of the turret is taken by a massive ball bearing and adjustable turret locking stud is provided for maximum rigidity. Hardened taper lock bolt and bushings insure long wear. Either lever or screw fed cross slide can be furnished. Both worm and direct drives to spindle are now available with power furnished by a two speed motor, giving speeds from 140 to 1000 r.p.m. for the worm drive and 900 to 3000 for the direct drive. Reverse or electrical braking control is optional.

Variable Speed Lathe

PRECISE lapping of gages and other parts at extremely low speeds down to 20 r.p.m. with ample power is now possible with a new variable speed lathe. It is also capable of rotating heavy work



up to 4000 r.p.m. and well adapted to perform final finishing operations, such as filing, burring or polishing. Infinitely variable speeds are in a ratio of 5½ to 1, based on the lowest speed desired by using a single speed motor, or 11 to 1 with a two speed motor. Optional is an adjustable slippage arrangement between motor and spindle permitting the application of only a predetermined amount of pressure on the part to be lapped. The lathe is equipped with a standard Nema frame motor, exclusive, quickacting smooth automatic brake, 3 or 4-jaw chuck or special fixture for holding work. This unit is made by *Schauer Machine Co.*, 2063 Reading Road, Cincinnati.

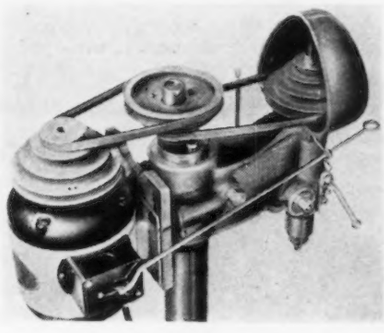


Radial Drill

FOR performing light duty operations *Walker-Turner Co.*, 602 Berckman Street, Plainfield, N. J., produce a new radial drill. The drill head is mounted on a heavy cast iron ram which rides back and forth in a supporting cradle on eight ball bearings. Drill head, ram and cradle swing easily right and left on a machined collar which is mounted on top of the raising and lowering column and crank-operated by a screw mechanism. The drill head can be tilted up to 45 deg. to either side. All positions can be fixed by conveniently located clamp locks and when drill is locked in position, it operates with a minimum of deflection. The drill can operate in the center of a 62 in. circle, ram travel is 18 in., maximum distance of chuck to table is 13½ in., capacity of Jacobs chuck is ½ in.

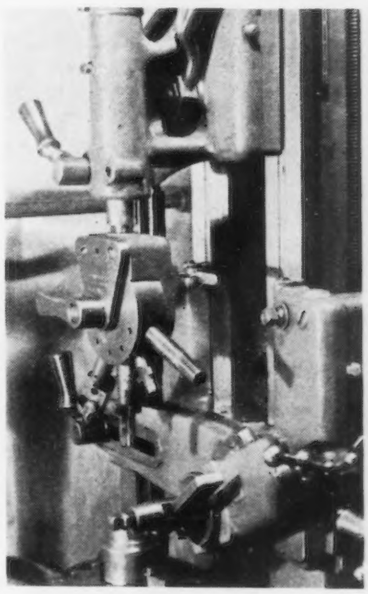
Multi-Speed Drill Attachment

A DRILL attachment has been developed by the *Delta Mfg. Co.*, Milwaukee, for 14 in. drill presses which provides a wide range of speeds for both high and slow speed models. This attachment consists of a heavy casting which mounts in the drill press column together with a cone pulley and two belts. A range of 12 speeds is available through various combinations. The multi-speed unit is quickly removed and easily adjusted. A grease sealed ball bearing pulley is used in the assembly and insures even, smooth, vibrationless running. This is an economical way to attain lower and higher speeds than could otherwise be obtained.



Tail Stock Turret

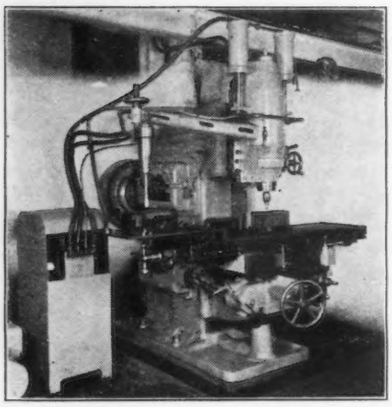
TO increase the speed of operation of bench and floor type lathes, the Quadruplex tail stock turret has been brought on the market by the *Specialties Mfg. Co., Inc.*, 35 Farrand Street, Bloomfield, N. J. This attachment



has four positions for tools having ⅝ in. diameter and comes furnished with a No. 2 Morse taper shank, although other shanks can be furnished as ordered. It can also be fitted to turret lathes where it will permit four additional operations per turret.

Follower Machine

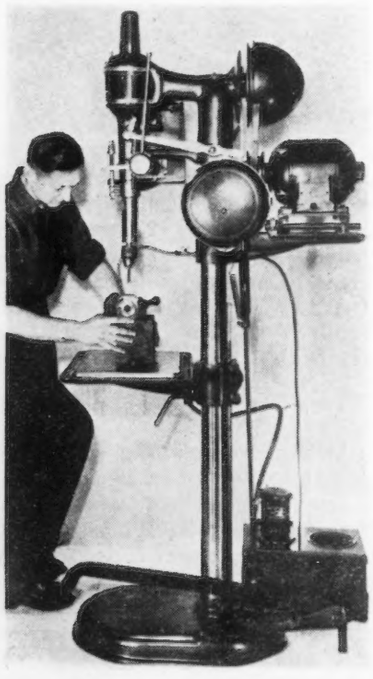
THIS precision duplicator machine can be used as an attachment to, or made an integral part of standard mills, boring mills, lathes, planers, increasing capacity and range of such machines, without impeding the work. Turchan follower machines are made in Detroit and sold through the *Na-*



tional Purchasing Co., 405 Boulevard Building, Detroit. The tool follows the pattern (either hard of soft), transmits to the shaping machine the settings to be made in order to produce the desired shape and holds the cutting tools to the exact tolerances of the original. It is claimed that considerable savings have been effected in the production of dies, moulds, patterns, propellers and duplicate turning jobs on lathes.

Tapping Machine

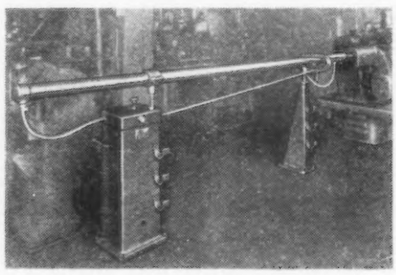
IMPROVED tapping machine built for lightness, compactness, ease of handling, and moderate in cost, is announced by the *Cleveland Tapping Machine Co.*, 1725 Superior Avenue, Cleveland. This machine features facility for tapping holes of varying depths without change of stop gage by means of a spacer hinged on the housing



and controlling a reversing lever. Adjustment is facilitated through convenient controls. A rigid spline is mounted on ball bearings and controlled either by hand or foot lever. The 1 hp. motor drives a four-speed pulley at between 260 and 820 r.p.m. through a V-belt and taps from ¼ to ½ in. diam. can be turned in steel. Equipped with split second reverse, the spindle will stop and rise automatically and begin revolving forward again, ready for the next operation, leaving operator's hands free to handle work.

Metal Bar Feeder

PNEUMATIC bar feed unit produced by *W. C. Lipe, Inc.*, Syracuse, N. Y., consists of an air cylinder which can be charged with a full length stock bar and which is open at the forward end. Inside the cylinder is a piston with a ball bearing cup center which supports the free end of the stock.



A low air pressure forces the piston to push towards the lathe and the bar is thus advanced until a stop arrests the motion. When the collet is opened again and the bar has play to move, piston travel will be resumed. Thus no handling of the often polished material is required and at the end of the travel, arrangements are made to provide for the following bar to push the remnant of the first further into the lathe, eliminating all waste. The pneumatic bar feeder is produced in capacities of 12 ft. length ranging from 1 in. to 2½ in. diameter.

High Speed Blueprint Developer

IN operating the new No. 159 Volumatic sheet developer, made by the *Charles Bruning Co., Inc.*, 100 Reade Street, New York, the sensitized paper and tracings are fed into the machine. After exposure they pass to the printer section. A vacuum separator roll at the discharge point of the printer separates the tracings from the exposed

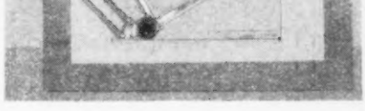
prints, allowing the prints to pass automatically to the developer.

The developer consists of a separator roll, water roll, and a series of bands which carry the developed prints through the drying section. The application of the positive vacuum separator principle is claimed to be an innovation. The developing section is driven by the printer, and is synchronzied to operate at exactly the same speeds.

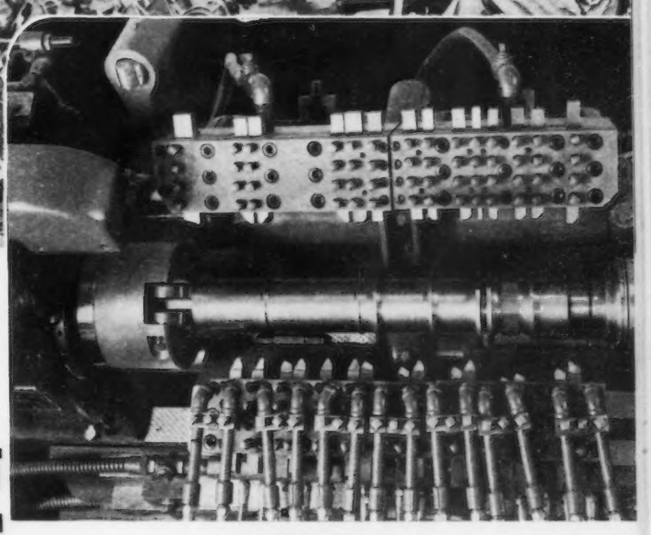
The same company produces a new "core-fed" electric eraser which is stated to be as convenient as automatic pencils. An eraser of 7 in. length is fed into the tubular armature shaft and can be fed out as it wears down. It is air-cooled and a sliding control button keeps the motor running without continuous finger pressure being exerted.

Drafting Machine

DESIGNATED as Master-Drafto model No. 60, a new drafting machine is produced by the *Drafto Co.*, 178 St., Cochranton, Pa. This instrument is light, yet strong and solid in its seamless steel tubing construction. Blades are designed for insertion of either boxwood or aluminum scales. The cast aluminum center mounting contains a leveling screw for adjustment towards the drafting surface. The protractor can be adjusted accurately to ½ deg. by a vernier and it can be locked at any angle. Through a latching spring it can also be locked at 0, 30, 45, 60 and 90 deg. on either side of the 0 reading.



Make product changes or model changes quicker at less cost



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Because the American public has learned to demand newer and finer models in everything from autos to vacuum cleaners with each new year, American manufacturers have learned to use a minimum of special machinery. Experience shows that versatile, adaptable Jones & Lamson Standard Universal Turret Lathes, Fay Automatic Lathes, Comparators, Automatic Thread Grinding Machines and Automatic Opening Die Heads can be changed rapidly from job to job or model to model while special machines can only be discarded. In adapting your plant to defense work today or to profitable manufacturing in future years, Jones & Lamson equipment helps you both ways. That's why it pays to put your production problems up to Jones & Lamson engineers.

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RAM & SADDLE TYPE UNIVERSAL TURRET LATHES

AUTOMATIC THREAD GRINDERS

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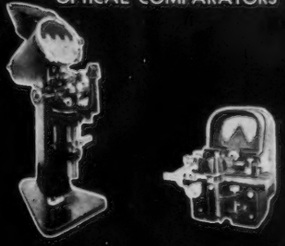


AUTOMATIC OPENING DIE HEADS

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Ford strike quickly affected work in parts plants . . . Delivery of raw materials to the Rouge checked . . . Steel for auto makers may be curtailed by fourth quarter . . . Automotive buyer reported to have offered premium price . . . Car assemblies decline.

DETROIT — Although there is no good reason why it should be singled out for special attention by the UAW, Midland Steel Products Co. in Detroit seems to be destined to play the peculiar role of precursor in the automotive industry's labor history. Twice it has been a proving ground for the UAW to test its strength and build up a fighting spirit in union members before more serious strikes came upon the industry.

Late in November, 1936, Midland's 2000 employees took part in a strike, with 1200 of the day shift men staging a sit-down and (for the first time) occupying the premises for an extended period, although a few weeks earlier Bendix employees had staged a sit-down and siege that gave the Midland workers a pattern to follow. That Midland strike crippled Chrysler's production and also handicapped Ford's Lincoln plant by cutting off the supply of chassis frames for Lincoln. The 1936 Midland strike was the beginning for the automobile industry of a painful period of bitter strikes that continued well through the spring of 1937 and resulted in the unionization of General Motors employees, followed by those of Chrysler.

Midland has just gone through another UAW strike, with employees returning to work on Monday of last week, a day previous to the beginning of the gigantic struggle between the UAW and Ford.

In late 1936 and the early months of 1937 the newfound weapon of sit-down and stay-in was in its heyday. Acknowledged even then to be illegal trespass, it has been since abandoned for purely practical reasons by the unions. Probability of being dislodged by a superior force, either of vigilantes or armed officers, is one of the reasons for its abandonment; strong public opinion because of its illegality is another.

Sit-down Tactics Used

It is significant that the Ford strikers last week used the sit-down only in the form in which it was employed in a few American plants prior to November, 1936: The workers sat down only to create a work stoppage but evacuated the plant before their occupancy of it had become an issue. As a matter of fact, the UAW has in the past months staged several minor "test" sit-downs on Ford property without much publicity—and the participants have been ejected with little ceremony by the Ford service department. The union has realized that it would be impossible to stage a sit-down-stay-in strike at the Rouge because the plant is so huge that it could not be held against the forceful attack that would be sure to result. In addition, the problem of feeding any considerable portion of the 80,000 employees of the Rouge would have been a nearly impossible task. Even the small number of employees locked in the plant this week, when all the exits were blockaded, required a shipload of supplies. Ford sent a Lake freighter and a tug from Toledo up the River Rouge with foodstuffs, including 6000 sandwiches. Occupancy of the buildings by these workers was only temporary, however.

The strike started with a sit-down in the rolling mill building Tuesday afternoon just before the day shift finished its work. The company managed to keep the news quiet until early evening, and then referred inquirers to the union itself for information about the strike. Within a short while it became apparent that the entire plant was tied up; the majority of the strikers left the buildings and participated in the blockading of a five square mile area which was under their domination for 24 hours. After that, relatively peaceful picketing supplanted the blockading and rioting of the first day of the strike.

Incidentally, within the first 24 hours a new record for violence and skull cracking was established. Tractor tie rods, pipe and hammers were popular weapons. Even after the violence was brought under control and the blockade removed, as a result of the management's agreement not to attempt operations for the present, strikers' cars were double parked on each side of Miller Road for the entire length of the plant.

Homer Martin in a New Role

Significant is the activity of Homer Martin, former president of both the UAW-CIO and the UAW-AFL, now officially retired from the labor movement. He appeared last Wednesday night before 3000 to 4000 workmen who assembled to launch a "back-to-work" movement. The meeting was called for the announced purpose of promoting the organization of an AFL union in the Ford plant. Martin advised against individual attempts to break through the picket lines but declared that within a few days he would organize 40,000 to crash their way into the plant.

Brother Homer doesn't appear to know just what his career is. He has been union leader, manufacturer's agent, and an instructor giving lessons recently to foremen in anti-strike tactics. His re-affiliation

A century and a half ago Ben Franklin wrote these words. Today, in this war-torn world, Time is still too precious to squander—is our most potent ally.

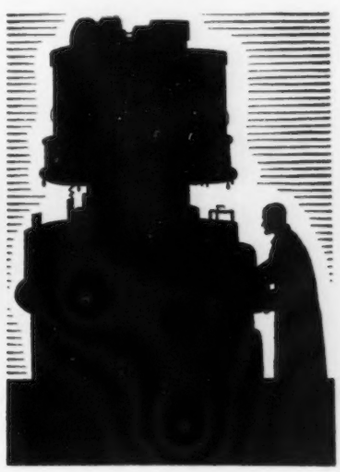
* * *

MACHINE TOOLS are the timekeepers on America's production lines. Without them Time and even Life as America understands it, may be lost.

Bullard machine tools can be vital weapons in your fight to preserve Time. A specific example: It used to take 315 minutes or 5¼ hours to turn and drill the arms of an aeroplane propeller hub spider. A Bullard Type "D" Mult-Au-Matic now does it in approximately 25 minutes. Or, put it another way, 12 of these parts are now machined in the time it used to take to do a single one.

Perhaps you have Bullard Mult-Au-Matics or Vertical Turret Lathes now. If so, new Bullard tools and tooling layouts may help you to make them even more efficient. If you do not have our Standard Vertical Turret Lathe Tool Catalog, send for your copy today.

THE BULLARD COMPANY
Bridgeport Connecticut



BULLARD

more than a machine-

A METHOD

with the AFL cause would complete the cycle.

Martin's claim that he has again been anointed by the AFL is denied by AFL union leaders in Detroit.

Parts Plants Affected

Lay-offs of hundreds of workers in vendors' plants became common toward the end of the first week of the strike as these manufacturers were unable to continue deliveries to Ford. The strike also stopped delivery of supplies of raw materials to the Rouge. One steel sales executive remarked that, from his viewpoint, it was providing a breathing spell.

Talking of materials, a top executive of one of the independent automobile builders, declared last week that the industry would continue to make automobiles "as long as we can get steel." This remark was significant and indicates the reality that has not been widely publicized—no matter what material supplies are cut off from the automobile manufacturers, they probably will be able to find substitutes for all of them, except steel. Shortages of steel are developing; several weeks ago instances of some embarrassment over crankshaft forging materials were were encountered and within the past week an executive commented that even steel sheet was proving unexpectedly difficult to obtain.

It has been learned that major figures in the steel and automobile industries got together here a week ago for a session on this subject and auto men were informed by the steel company that no more sheet orders will be accepted for the fourth quarter. Coverage up to Oct. 1 is already pretty complete. Some steel orders from older customers for delivery in the fourth quarter have been accepted.

This pronouncement is the most drastic that has ever been hurled at the automobile industry. It is extremely difficult today to evaluate its effects, even though, as stated above, there is a known tightness already in sheets, especially for certain body types, but it is the general opinion that some automotive buyers have loaded up with quantities of steel that will carry them for some time. It is probably premature to jump to the conclusion that automobile production will be cut off in the last quarter of this year, but it is certainly going to be reduced.

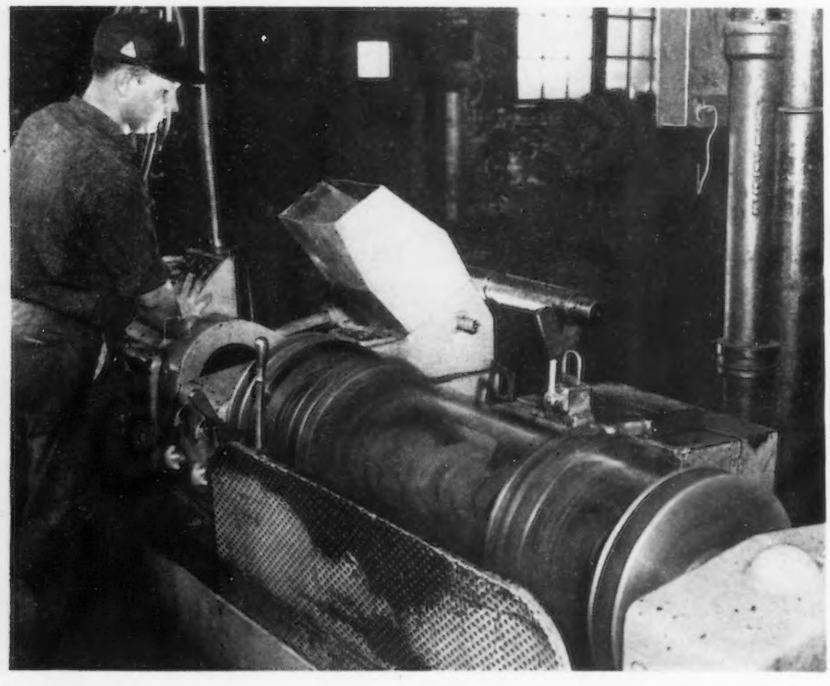
Buyer Offers Premium

At least one automotive buyer has offered to buy steel on the Pittsburgh f. o. b. price, paying the full freight and giving up the 10 cent preferential freight rate that industry in Detroit has enjoyed. This is the first definite indication that anyone in the industry is willing to pay a premium to get steel. The offer was rejected, perhaps in part because the supplier could not make delivery of the large tonnages of steel which the buyer hoped to place when he made the concession on price.

Last week there was a rumor that Buick had been assured by the OPM, or some other official source, that it would have all the aluminum that it would need for pistons and would not have to retool for cast iron. This definitely is not true. At the same time, it is not true that Buick has switched to cast iron. Automobile companies probably will have enough aluminum to provide pistons for the remainder of 1941 models. Beginning with 1942 models, the story may be different.

Cessation of assemblies of cars at the Rouge on Tuesday, and in other Ford plants throughout the country later in the week, accounts largely for the drop in output to 116,255 units compared with 124,165 in the previous week and 101,655 in the corresponding week of last year, the figures being those compiled by Ward's Reports, Inc.

BUICK CRANKSHAFT being mass-centered before machining so as to eliminate heavy cuts in one place and light cuts in another. This preliminary operation also simplifies the problem of dynamic belancing of the crankshaft, which is the final operation. Performed on special vertical balancers designed and built by General Motors Research Corp., balancing of a Buick crankshaft is brought with ⅜ oz.-in. of perfect balance.



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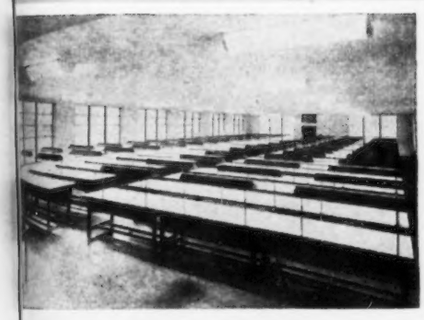
• • • **A sharp drop in machine** tool exports to Great Britain sent February shipments of metal working machinery 32 per cent below the January level, the Commerce Department reports. Machine tool exports to England were almost halved, dropping from $16,902,862 in January to $8,764,766 in February.

Shipments to Canada, however, continued to rise, increasing from $3,806,043 in January to $4,272,527 in February, the Department said. Machine tool exports to Japan declined to $16,930 from a January figure of $217,268 but Russian consignments increased to $484,542 from a January total of $95,238.

The February decrease brought exports of metal working machinery down 32 per cent below the January level. February exports of power-driven machinery suffered a sharp decline over the February, 1940, the Department reported.

"MORE STEEL!"

. . a demand that requires maximum production from your present facilities



The new McKee Building houses two large, modern drafting rooms, one of which is shown above.

The latest types of lighting, air conditioning and equipment help McKee engineers to serve the Iron and Steel Industry with maximum efficiency and speed.

ARTHUR G. McKEE & COMPANY can help you meet today's demand for increased iron and steel production.

Thirty-six years of iron and steel plant engineering experience are available to you in the McKee organization. The application of this experience will assure you of maximum production from your existing facilities.

McKee engineers are production-minded. If alterations are necessary to speed up deliveries they will be made with a minimum sacrifice of present production.

The ultimate object of McKee engineering is *maximum production of better iron and steel at lowest cost.* This organization is well fitted, through long, world-wide experience, to attain this object for you.

Arthur G. McKee & Company

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2300 CHESTER AVENUE · CLEVELAND, OHIO

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Washington

BY L. W. MOFFETT
Washington Editor

• Each step in price-fixing requires another . . . With maximums fixed on scrap, will similar action be taken on pig iron and finally on finished steel? . . . Biggest problem is how to lift industrial production.

WASHINGTON — Once begun, Government price-fixing starts a chain, link by link, each difficult to weld. It is the story of the bird of the nest which rests on the branch of the tree with its roots and the green grass all around.

Ceiling prices have been fixed for iron and steel scrap, mixed aluminum scrap, zinc scrap and secondary slab zinc, used machine tools and coal. Used machine tools excepted, this list is confined to raw materials. This fact is taken to reflect the often repeated statement of Government sources to restrict price fixing as long as possible during "peacetime" to a minimum. Two reasons are given for this policy: (1) The tremendous task and machinery involved and (2) supposed opposition to regimentation of industry—though in other fields industry is subjected to rather rigid Government control, a circumstance made necessary by the emergency.

Limiting control of prices to raw materials apparently is based on the point that since they are the source of production a ceiling on them automatically controls costs and prices of the processed manufactures. There is much to be said for this premise. But it is only part of the picture. For one thing, if one raw material is price controlled, it may well be found necessary to add another link to the chain by putting a ceiling on another raw material that is interchangeable or intermingled with it in the process of production. In ordinary practice pig iron is mixed with scrap in making steel. Now, to mention only one industry, will prices be fixed on pig iron and through to semi-finished and finished steel?

How About Pig Iron Prices?

Should such "minus" districts as Pittsburgh encounter increasing difficulty in getting scrap under the price schedule that has been proclaimed and of necessity turn more to pig iron with a valley basic iron price of $3.50 over No. 1 heavy melting steel at Pittsburgh, would not this point to extended price control to pig iron and then to steel? Higher costs through increased use of pig iron for defense purposes at the cost of civilian needs would result in higher steel costs for if one important cost factor gets out of line the impact on other factors is inevitable.

Just where should the resulting prices be allowed to go? The Price Stabilization Division of the National Defense Advisory Commission reflecting an Administration policy is exerting a sincere and most worthy effort to prevent price inflation, realizing fully the dangers to the entire economic system if prices get out of control.

There may be exceptions but it must be true that most industries want to keep prices in check. So far they have on the whole succeeded, though the most serious threat to price rises obviously is due to labor demands, and pending the outcome it is difficult to see how the Government can clamp on ceiling prices with any assurance that they can be maintained.

There is also a question whether ceiling prices fixed will operate to the best of advantage. In emergencies the biggest thing is production. Important as they are, prices are secondary. Therefore the price should be so fixed that it would within reason encourage maximum supplies. Will the scrap prices do this?

Edwin C. Barringer, executive secretary of the Institute of Scrap Iron & Steel, Inc., implies doubt and there are consumers as well as producers who share his view.

In a well-reasoned statement pledging the "ungrudging cooperation of the scrap industry with the government's (price) program," Mr. Barringer said:

"We are not advocating an upward spiral of prices, but do urge a price level that will be adequate to bring out the tonnage required to maintain peak operations by the (steel) mills."

Situation Differed in Last War

This is a perfectly sound principle. It is exactly the policy that was followed by the old War Industries Board, though it certainly is not desirable that prices be lifted to the levels fixed by the WIB. The conditions then were different from those now prevailing. The economy then was on a definitely inflationary basis due to high prices resulting from demands from the allies, and the prices fixed by the WIB, following the United States entry into the war, reflected sharp reductions, though much higher than existing prices.

The WIB principle was to establish prices at a sufficiently high level to encourage high cost production, production being the big thing. Though this meant a wide margin for the low cost producer the government received excess profits or a large proportion of them through taxes just as it should and undoubtedly proposes to do again.

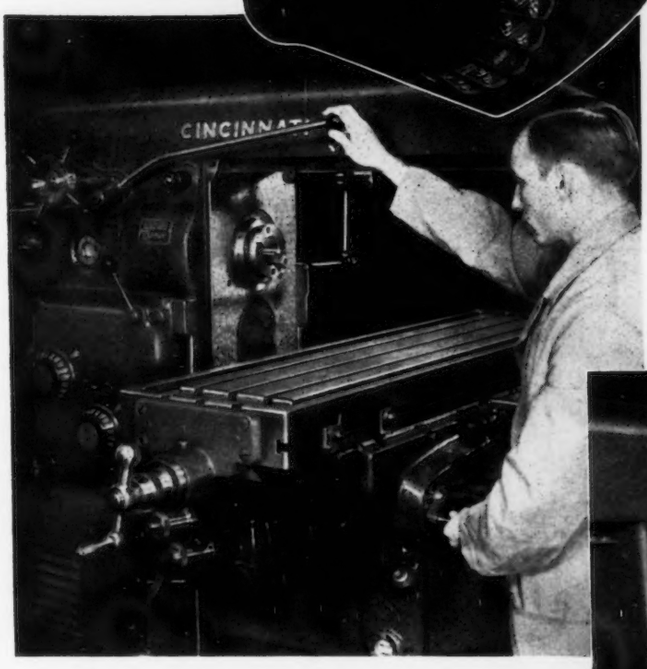
While there is no justification whatsoever for fixing prices at the high levels that were established during the World War, the view prevails not only within but beyond industrial circles that they should be adequate to bring out the greatest possible production.

And since price fixing has begun it is also the belief

Easy as pointing your finger

ELIMINATE the work—and the walking—of changing speeds and feeds and you'll find that the operator uses the right speed-feed combination for the job . . . turns out more work . . . better quality work. That's one of the direct benefits you will find in using CINCINNATI Dial Type Millers, for it's as easy as pointing your finger to change speeds and feeds.

While the operator merely holds a small lever in the speed or feed position, the machine does the actual job of shifting gears. The indicating dial clicks around, and there, in a few seconds, you have the desired speed and feed for the work being milled. Practically no effort —and no walking, for selection can be made from the front or rear working position. Catalog M-970 illustrates and describes all the features. Write for your copy today.



Changing speeds and feeds at the front . . . the Dial Type way.

CINCINNATI

Changing speeds and feeds at the rear . . . the Dial Type way.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . DIE SINKING MACHINES

that sooner or later it will become widespread. Not only that, it is believed that if emergency demands are to be met efficiently, there will have to be control over labor to a vastly greater degree than now exists unless labor itself puts down the uprising caused by some ambitious leaders and some sinister leaders.

Again, price control, it is reported, promises to be merged with priority control and the name of the "controller" is already being bruited speculatively.

This indicates that, though an exact duplicate may not be in contemplation, there is a move in the direction of another WIB. At least there is circumstantial evidence to this effect. Bernard M. Baruch, former head of WIB is a frequent caller at the White House and was a luncheon guest of the President last week. Mr. Baruch has consistently advocated a set-up similar to the WIB with a one-man control of production, priorities and prices.

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Washington

• • • **The Bureau of Mines** says that the domestic magnesite industry is adequate for defense requirements. It attained a record production of 333,166 net tons in 1940, an increase of 3½ per cent over the 1917 war peak production. Imports in 1940 provided only 22 per cent of the available supply of dead-burned magnesite. The chief use of magnesite is in the form of refractory materials for lining iron and steel and nonferrous furnaces and lime and cement kilns. Domestic magnesite also is scheduled in 1941 as raw material for magnesium.

If any emergency arose involving a complete stoppage of magnesite imports, the bureau said, it is believed that domestic sources could meet any requirements over a protracted period. No bottlenecks are likely to develop in producing crude material, it was pointed out, since magnesite mining operations can quickly be expanded.

"Dead-burned dolomite could be substituted for grain magnesite for furnace bottoms," it was added. "A further increase in utilization of magnesite-dolomite refractories would enable available quantities of magnesite to supply an increased demand. Moreover, additional domestic sources of magnesite in Nevada, Texas, and Vermont developed within the last few years promise adequate supplies to maintain the steel industry at 100 per cent of capacity.

"Other sources in the Western Hemisphere having available supplies are Canada, which furnished just under 300 tons of imports of dead-burned material in 1940, and Mexico and Venezuela which supplied a small tonnage during the last war."

Reports indicate that production control would be made a separate activity, but that procurement, priorities and prices might be consolidated under a single head.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

I GUESS WE MUST BE OUTA BANDAGES--I'LL HAFTA ORDER S'... OOP! GOSH--THAT BOX BUSTED!
WHAT THEY NEED IN THAT FIRST AID DUMP IS A REAL TRAINED NURSE
NOT IN THIS WAR SPEEDUP--TH' BOYS WOULD STAY IN THERE TOO LONG! FIRST AID PATIENTS COME OUT OF THERE SO QUICK THEY THINK TH' GUY IS GOOD!
FIRST AID
WAR EFFICIENCY
J.R.WILLIAMS 4-18
COPR. 1941 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

↓ ↓

Washington

• • • **Composed of 15 members**, representing the public, employers and employees, a committee of the gray iron jobbing foundry industry has unanimously recommended a 40c. minimum wage for that industry in a report filed last Thursday with Gen. Philip B. Fleming, Wage-Hour Administrator. Heading the committee is Sidney E. Sweet, St. Louis, Dean of the Episcopal Church.

The recommendation, if approved by General Fleming, after a public hearing, will raise the hourly wages of an estimated 8 per cent of the 150,000 to 200,000 workers in the industry. It would apply to all occupations necessary to the production of the articles specified in the definitions, including clerical, maintenance, shipping and selling occupations, but does not include employees of a manufacturer who are engaged exclusively in marketing and distributing products of the industry which have been purchased for resale.

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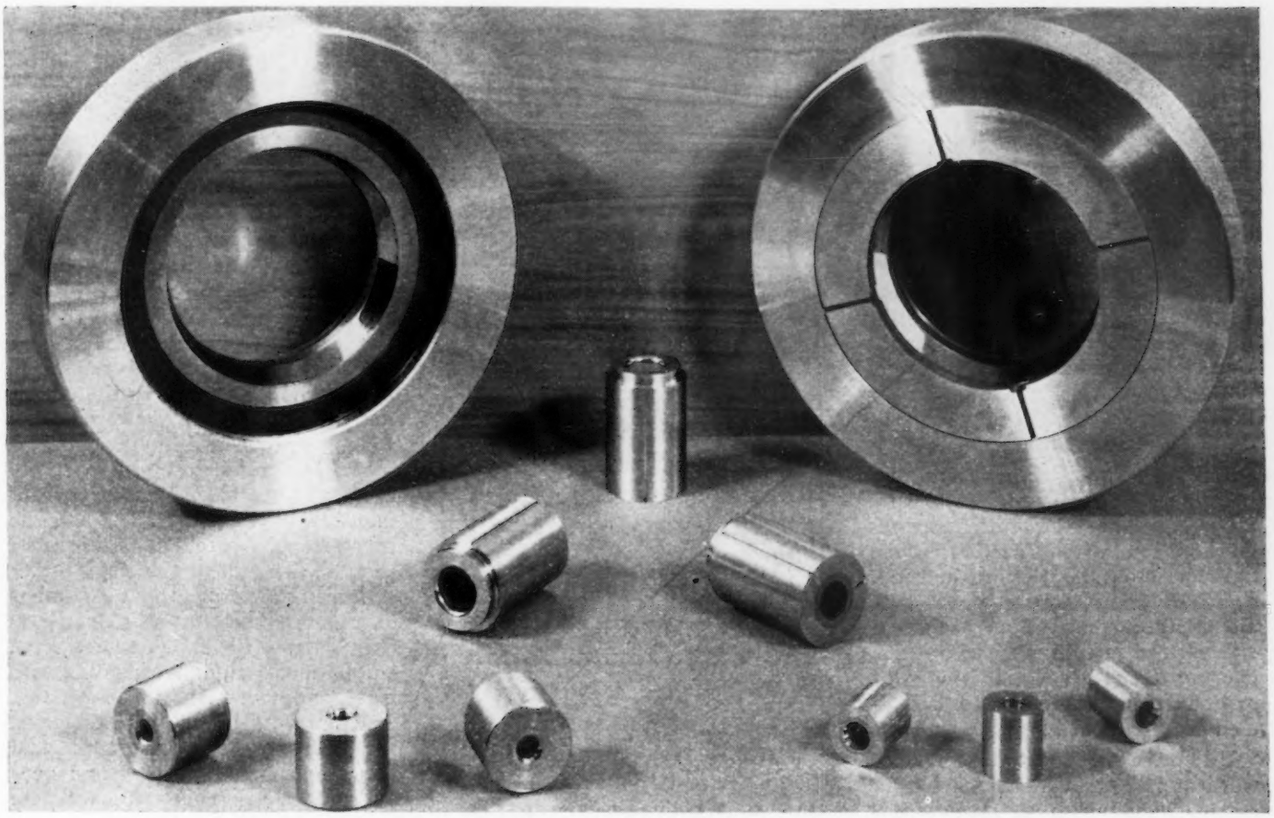
• • • **Total unemployment** in the U. S. reversed its usual trend for February dropping 317,000 from a total of 7,356,000 in January to 7,039,000, according to the preliminary estimates by the Division of Industrial Economics of The Conference Board.



Carboloy Dies For Defense Requirements

Shell, bombs, naval condenser tubing, precision shaped rifle parts, signal corps wire, bullets . . . these and other defense parts requiring processing through dies are being turned out better and faster with cemented carbide dies.

A few of the many Carboloy dies being produced in increasing quantities each week in the Carboloy plant for this purpose are illustrated. A background of more than 12 years devoted *exclusively* to the development, manufacture and application of cemented carbides is at your disposal for your defense production requirements.

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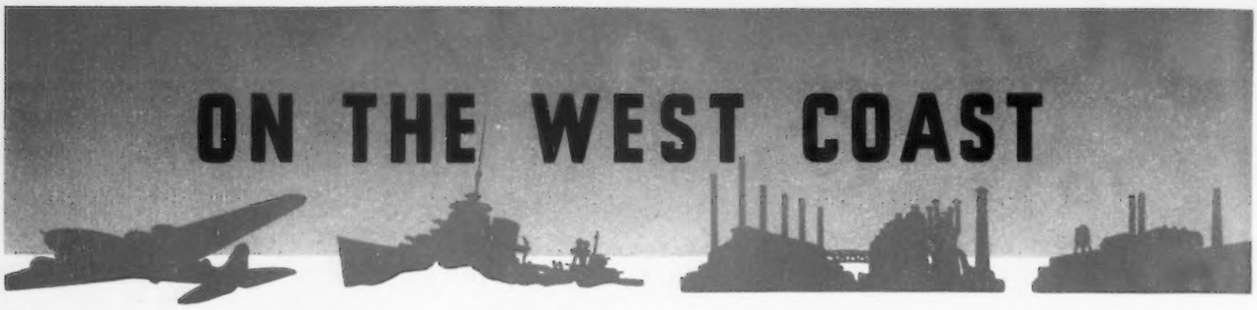
The Mark of CARBOLOY REG. U.S. PAT. OFF.

CARBOLOY REG. U.S. PAT. OFF. DRAWING AND SIZING DIES



THE dove of labor peace which for the past two months has been hovering over a meeting of representatives of major Pacific Coast shipbuilders and their employees last week gave signs of nesting with the group for the duration of the national emergency.

Leaders of the Pacific Coast Shipbuilding Stabilization Conference announced that the joint labor-industry committee had reached agreement on all points including a complex scale of wages to apply at all plants and needed only ratification by the membership to put the pact into effect. Ratification was expected and the pact was scheduled to go into effect by April 21.

Unique in that it sets up a framework of industrial relations for an entire industry in a large geographical area, the agreement was regarded by AFL representative John P. Frey as a model not only for the shipyard industry on the Gulf and Atlantic Coast but also for other defense industries.

In addition to a key clause which guarantees that there will be neither strikes nor lockouts and that all disputes will be settled by arbitration, the final agreement is expected to set up a coastwide scale of wages, which would represent a concession on the part of southern California employers. The unions, on the other hand, would agree to a six day week with time and one-half pay for Saturdays and double time for Sundays. Employees in many yards have been enjoying straight double time pay for overtime.

Other major provisions would provide that there be no limitation of production at any plant and that, while the agreement would remain in effect as long as the emergency prevails, the subject of wages will be brought up for review at the end of a year. Machinery for adjustment of all grievances is provided.

CIO observers have indicated that the few Pacific Coast shipyard workers organized by them would be provided for under a similar agreement.

San Francisco's militant AFL Machinists' Union, Local No. 68, which includes shipyard machinists in its ranks, and which has threatened a strike despite the coastwide agreement, had its ears pinned back by the Bay Cities Metal Trades Council which forbade any shipyard walkout. The council indicated, however, that it would sanction a strike by the union against other San Francisco machine shops unless conciliation attempts now under way were successful. The union is standing pat on retaining a double time rate of pay for all overtime work, while employers seek to reduce this to time and a half rate for the first eight hours on Saturday, with double pay for all other overtime.

• Labor peace assured in shipyards as conference approves agreement . . . Payrolls zoom in aircraft centers . . . Vultee will dissect captured Messerschmitt to analyze production technique . . . Aircraft industry ponders executive organization.

By and large, however, San Francisco's baptism of labor fire seems well in the past, and the city is now essentially stable from a labor standpoint.

AMERICA'S rich diet of rearmament spending has brought a rash of boom towns all over the map, but the West Coast, heretofore relatively immune to big industrial development, is reacting with boom cities. Seattle, which grew out of knee pants with the Klondike rush, has been a metropolitan Rip Van Winkle since. While the rest of Coast was making big population gains between 1930 and 1940 Seattle showed a gain of only 0.7 per cent, with 368,000 people within the city limits and 426,000 including adjoining residential districts.

The census came just before defense money began to pour in. Today, as a direct result of the increased employment at the Boeing Aircraft Co. plant, one person to every twelve families in the city is now on the Boeing payroll, and Boeing's present 11,000 employment is expected to be increased to 18,000 by summer. With a current monthly payroll of $1,350,000, the big aircraft plant supplies more than 35 per cent of the city's worker income, Aeronautical Chamber of Commerce estimates. Boeing is only part of the picture. Five shipbuilding plants are going full blast, and have plans for expansion. Seattle is still the jumping-off point for Alaska where the Army and Navy had combined to spend over $25,000,000 as this was written. Add to this a major Navy yard across Puget Sound at Bremerton whose construction office had plotted about $7,500,000 worth of capital improvements at last reckoning. In terms of a place to live, classified sections of Seattle newspapers show more advertisements for house trailers (2 to 3 rooms, bathtub, complete wiring) than furnished houses for rent. A trailer city has grown up near the Boeing plant, rent as much as $15 a week. A new want ad classification is "Houseboats," which are convenient to the shipyards. In terms of a place to work for wages, one structural steel fabricator reports paying draftsmen $110 to $125 per week, most of it overtime, and the "Help Wanted" sign still out. As in other cities, skilled mechanics, layout men, and template men are at a premium. Retail sales in February were up only 21 per cent over last year, but the city is not yet going full swing.

Undoubtedly startled by the northern defense lights one civic horntooter estimates the population of Puget Sound will skyrocket to 1,700,000 if the democracies win the war.

Total aircraft payroll at San Diego, Cal., estimated at $34,000,000 for 1940, was 22 per cent of the community total and has increased since, the Aeronautical Chamber of

Commerce says. At San Diego are located Consolidated Aircraft, Ryan Aeronautical and Solar Aircraft. The 1941 aircraft payroll for these plants is estimated at $60,000,000 —or nearly one-third of the workers' income in that city. Aside from workers' payrolls, San Diego is a big Navy and Marine base with (mushrooming) personnel and construction, and now has been designated as the site of a major Army encampment to boot.

Douglas Aircraft, with plants at Santa Monica and El Segundo, Cal., has a current monthly payroll of close to $3,310,000. Total payroll for 1940 was $27,126,269. With a $12,000,000 "blackout" plant well under construction at Long Beach, Cal., Douglas expects to pass out $70,000,000 a year at the pay windows when peak employment is reached.

LOCKHEED AIRCRAFT and its affiliate, Vega Airplane, at Burbank, Cal., has a combined monthly payroll of $3,800,000 and expects to double this by December.

When the pay checks of Northrup, Vultee, North American and the various engines, parts, and accessory makers are counted in, it is estimated that the aircraft payroll for Los Angeles County alone for 1941 will be about $175,000,000.

That is what war means to the man who works in the aircraft factory. Preparation for war has been a hard but happy task for the aircraft communities. Preparation for peace presents a far more difficult problem. Civic ingenuity will be hard pressed to keep the payroll fuel from running out if military budget tanks are punctured when the war ends.

A Nazi Messerschmitt-110 fighter plane, which was the subject of newspaper speculations as to its destination during its voyage to this country, arrived last week at the Vultee Aircraft plant at Downey, Cal. The plane, shot down in England, is the first Me-110 to arrive in this country and it will be carefully dissected with special clinical attention to gun installations, sights, armor protection, sealing tanks and other points of the combat anatomy. R. W. Palmer, Vultee's vice-president in charge of engineering, will analyze the ship particularly from the standpoint of mass production design.

"By studying how the parts are fabricated and assembled we can pretty well deduce some of the mass production methods the Germans are using and see how they stack up with the latest techniques in our own country."

The Me-110 is of particular interest from the standpoint of fire power. It carries two 20-mm. cannons fixed to fire forward through the nose. In addition, the pilot controls two fixed machine guns in the nose. The aft gunner has twin machine guns on a movable mounting, with a 60-deg. range of fire upwards or to either side.

Vultee, incidentally, has announced completion of its new Nashville, Tenn., airplane factory, the first to be completed within the mid-continent defense zone since the national defense program got under way. Expansion of the plant, which now has approximately 900,000 sq. ft. of floor area, was begun early in October. Without awaiting completion of construction, production of airplanes was begun immediately in the 150,000 sq. ft. of floor area in the original plant.

THE problem of executive organization in the aircraft industry has become even more complex with the announced establishment of midwestern assembly centers by most Pacific Coast producers. Last week, Douglas announced a series of executive councils to perform the various functions of management, topped by a super council. This week, North American Aviation, Inc., announced a new organization structure under which the operating functions of its three plants will be divided into six basic elements—engineering, manufacturing, industrial relations, finance, quality control, and public relations. The head of each of these functions will be responsible directly to President J. H. Kindelberger, and J. L. Atwood, vice-president and assistant general manager, and will have charge of all work under the specified category in each of the three plants.

Robert E. Gross, president of Lockheed Aircraft Corp., told stockholders at the annual meeting last week that production for the first three months of this year "will be nearly as much as in half of the entire year 1940." He added that the company had a good chance of doubling the 1940 production record in the current year.

Douglas Aircraft Co. announced that its new $12,000,000 Long Beach factory was being constructed in advance of schedule. Ten of the 12 buildings already are in various stages of completion. In 32 days' working time, four assembly units were erected using 3763 tons of structural steel, an average of nearly 120 tons of steel being raised and riveted into place daily.

Another favorable labor development came in northern California Monday (April 7) as 2200 workers at four General Motors assembly plants at Oakland, Cal. brought production into full swing after a two weeks strike called by the UAW. Terms of the settlement were not announced.

Photo by International

UNDER THE MICROSCOPE: Vultee Aircraft engineers are examining a German Messerschmitt 110, shot down over England, and taken to California for study.

Fatigue Cracks

BY A.H.DIX

Salve, with a Touch of Sulphuric

• • • The well-cushioned backbone of your favorite family journal's make-up editor, Frank J. Winters, should be patted at intervals for the skill and restraint he displays in arranging the pages. The make-up is clean and inviting to the eye. It has the expert simplicity of a pro's golf swing, and is one of the reasons why the family has just moved up into the new, all-time high 16,000 stratum.

F. J., as we never call him, avoids socko layouts that hit you between the eyes and cause acute nausea. He gets his effects without strain. The style looks deceptively easy to copy, but isn't. The knack is acquired only after years of battling with the temptation to indulge in arty layouts, with trick type running uphill and down dale, and "making fency" with the pictures.

But enough of the soft soap. The same make-up genius sabotaged this page of Mar. 27. When we went to the Tool Engineers' Show he crossed his heart and solemnly promised to read proof for us. He forgot to, resulting in bizarre spellings and incoherencies that give the impression the page was written after a bout with six-months-old applejack. *The rat.*

Stoppers

• • • Teaching Hungry Acid Table Manners—*National Lead Co.*

Closed by Mistake—Will Re-open Soon—*Sign on an Ohio tavern, seen and sent in by E. E. T.*

He Wants to be Alone

• • • The week before last we dusted the cobwebs off the word *xenophobia* and exposed it to the light of day. As it means fear of strangers, it seemed to us to have an advertising connotation, for the function of advertising is to make friends, or at least acquaintances, in wholesale lots.

We said at the time that we would like to see what our favorite artist, Harry Johnson, could do with making xenophobia graphic in four colors. Harry has obliged. The

central figure, you will see, has an acute case of xenophobia. In the original he is exuding waves of fear in technicolor, which we are sorry we cannot reproduce, as our budget keeps us down to plain black and white.

Midwest Churchill

• • • Each week the brains department garners about two or three times as much news as it can print, which calls for much winnowing. The end product that meets your eyes is, of course, high in vitamin content, but some of the chaff contains a sparkle, as for instance this paragraph:

> Winston Churchill has applied for admittance to the Henry Ford Trade School, but has been turned down because he is too old. Only boys between 12 and 16 are accepted. Winston is 18 and lives in Ionia, Mich.

Quid Pro Quo

• • • Our knuckles are wrapped anonymously by a Chicago subscriber who writes in part:

> "Have subscribed to your magazine for many years. Your editorial writer and your circulation manager should have a conference."

If he will send us his name we will send him our alibi.

Puzzle-Hater

> Some of your readers must get a thrill from those "problems" printed in 6 pt. at the bottom of your page, because you do get replies. As for me, such mathematical puzzles leave me colder'n a healthy canine's schnozzle, but I get a h-ll of a wallop out of the insouciance with which you introduced sesquipedalian words into a column otherwise Arthurbrisbanic in style.
>
> —Ernest C. Roberts, Clark Controller Co., Cleveland, O.

We thought for a minute he said *Arthurbrisbanal*, but as he didn't we will confess that most of the problems are over our head, too. We have conducted a secret poll of this page's eighteen loyal readers and find that the majority is violently anti-puzzle. The remainder is just as violently pro-puzzle. There seems to be no middle ground, no I-can-take-'em-or-leave-'em-alone tolerance.

But our public isn't merely divided into pro- and anti-puzzle factions. There is another schism—with Rabelaisians on one side and puritans on the other. The latter complain when we spell *hell* right out, requiring us to spell it h-ll, leaving the reader in doubt as to whether we mean *hall, hill, holl, hull, hyll,* or, of course, hell itself. The former, the Rabelaisians, submit contributions that are not quite printable, as, for instance, a recent one signed "Deacon," based on the phrase "wire drawers" as used in a recent ad.

Pleasing all factions is a problem, and makes us realize what the President must be going through these days.

He Put in His Thumb . . .

• • • The long words don't bother us much, as there is enough to 'em to give you some kind of a toehold. But some of the short, unusual are plain h-ll. For instance, our favorite columnist, Bill (Armco) McFee, who writes "Mac's Chat" in the *Ingot Iron Shop News*, speaks of a certain individual as having a "useful though not skittley life." *Skittley* is new to us and we pant for word from the sage of Middletown, Ohio, as to what it means.

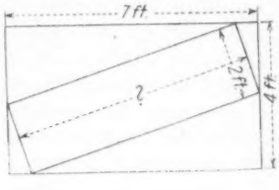
Puzzles

• • • Last week's match problem works out this way:

Theodore Blau, "XIX," and Robert T. Griffiths found the Mar. 20 "age" problem so much child's play. But A. W. Kelly of Youngstown, O., and Lt. Commander Alston R. Simpson of Newport News, Va., deny that Don Morse's answer to the Mar. 6 ladder-in-the-alley problem is correct. Messrs. Kelly and Simpson say that 12.31+ ft. is the correct answer and they prove it.

If this keeps you up past midnight blame Charles S. (Hoskins Mfg.) Kinnison:

A housekeeper wishes to purchase a strip of carpet 2 ft. wide, to be placed diagonally in a hallway 4 ft. by 7 ft. What is the longest strip that will fit diagonally, touching each side of the hallway as shown in the diagram?



News of Industry

EASTER EGGS: Bombs are lined up to be loaded on this British Wellington bomber. The photograph, passed by the censor, was taken during a visit to a Bomber Command station from which planes have been taking off to attack Brest.

Draft of Skilled Men Threatens Production In Defense Industries

• • • **Fear that continued** drafting of skilled workmen into military service by civilian draft boards unfamiliar with industrial production problems will interfere with defense plant output was growing this week in some industrial centers.

In one area farm workers were reported getting 6-month service deferments denied skilled workers in the metal-working industries.

In most industrial centers, THE IRON AGE learned, employers are reluctant to help a skilled employee press his claim for deferment before draft boards on grounds that the employer may be called "unpatriotic."

Soon, however, it may be unpatriotic not to shield U. S. procurement from unnecessary disruption by drafting of "soldiers of industry" into military service where their special skills cannot be utilized for defense.

Chief among sufferers from the draft are highly industrialized communities where draft boards are unable to fill their quotas except by taking skilled workmen.

An IRON AGE study of 14 industrial plants (including steel plants) at Pittsburgh discloses that up to the end of March approximately 930 employees out of a total of 124,000 had been given leaves of absence for army service under the selective service law.

(Charles L. Parsons, secretary of the American Chemical Society, said this week at St. Louis that drafting of chemists for selective service training has created a "grave situation." Chemists and chemical engineers are "in the production army now," he said).

So far the drain on skilled workmen has been most noticeable in Michigan where many plants are seeking skilled help to be used when the automotive industry gets into high gear in production of tanks, guns, airplane parts, airplane engines and many other vital items.

Employers in Michigan appear to have been leaning over backward on the matter of asking local draft boards to grant deferments. Now, however, drastic action to preserve Michigan's resources of skilled labor is being urged. Complaints by industrialists to the Detroit Board of Commerce and the Detroit Employers' Association indicate that the attitude of local draft boards has been in all too many cases that "no person is essential to industry."

Protests to Gov. Murray D. Van Wagoner have emphasized that the problem is important because industry in Michigan is being relied upon for such a large percentage of defense production. In response to urgings from industry that the Governor communicate with every local draft board on this subject about 10 days ago, bulletins were sent out to the draft boards but were not phrased in the "all-out" language needed.

The Employers' Association at Detroit is surveying local industry in an attempt to determine the number of deferments that have been requested and the number obtained so far.

General Motors' policy is to recognize the importance of the country's military forces first of all. The company spokesman says that so far there are no outstanding instances of operation of the Selective Service Act to the determent of defense work.

Similarly, Ford Motor Co. spokesmen have reported that their policy is to avoid asking for deferments. In the one instance where Ford's engineering department is known to have asked for a deferment for an employee, it

OPM Asks Plants To List Obstacles To 7-Day Week

• • • **Larger U. S. defense plants were being asked this week by the Bureau of Labor Statistics (for the OPM) to give reasons why any of their plants, if idle or on part-time, are not working 7 days a week, 24 hr. a day.**

Questionnaires sent out by the bureau asked whether full-time operations are being prevented by lack of orders, unavailability of supervisory workers, local legislation, labor agreements or other causes. Estimates of labor requirements for the next 12 months are requested.

was granted. Widely publicized have been the cases of Henry Ford, the second, and Benson Ford, sons of Edsel Ford, president of the company. Neither of these young men has asked for deferment, nor has the company, although they are employed in the new airplane division which Ford has established.

Actual operation of the deferment procedure is illustrated by one Detroit industry's request which was finally met with the allowance of four months' deferment for a skilled employee. The understanding was that the industry would train another man to take the place of the deferred man, and the draft board decided that four months was sufficient time.

Important industrialists have expressed the opinion that many employers will have to be urged to ask for deferment in the national interest. An important spokesman of industry reports that Legionnaires on draft boards had in many instances shown more enthusiasm for permitting the Selective Service Act to follow a course to its military objective, rather than grant a deferment asked by industry. He said that specific instructions from high officials in the draft set-up and education to change this attitude are definitely needed.

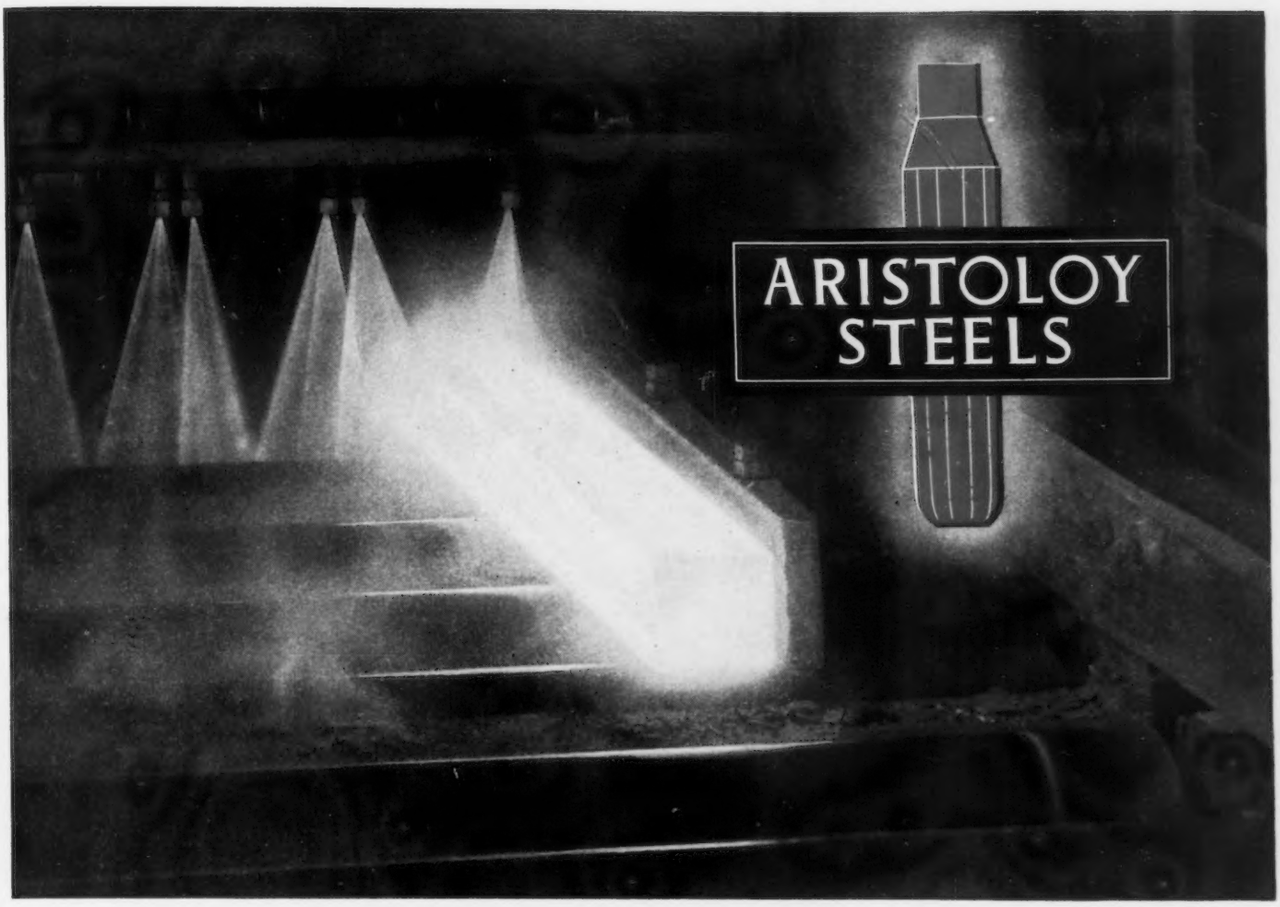
A Michigan unemployment survey is pointed to as proof that the state cannot spare its industrial employees. Whereas Detroit had 400,000 in manufacturing industries in January, 1940, and 461,000 in January, 1941, an increase to 571,000 by January, 1942, is forecast. A large number of the additional employees required will be in skilled classifications.

Delco-Remy Expands To Make Plane Engine Parts

Anderson, Ind.

• • • **Additional manufacturing** space for Allison aircraft engine parts will be constructed here by Delco-Remy, a General Motors division. Addition (to operate in September) will comprise 200,000 sq. ft., will be completely air-conditioned, which is required for precision parts manufacture.

MORE THAN 30 LOCKHEED Hudson bombers are pictured being prepared for shipment to Britain. Some of the planes have already been dismantled for shipment. (This week the U. S. government announced figures on plane exports to various countries would no longer be made public).



OPEN HEARTH ALLOY STEELS:

BARS — Hot Rolled, Annealed or Normalized, Spheroidized Annealed, Heat-Treated, Cold Drawn, Straightened, Turned, Centerless Ground.

ELECTRIC FURNACE ALLOY STEELS:

BLOOMS, BILLETS, BARS — Hot Rolled, Annealed or Normalized, Spheroidized Annealed, Heat-Treated, Cold Drawn, Straightened, Turned, Centerless Ground.

ARISTOLOY S.A.E. ALLOY BILLETS AND BARS; OXIDATION AND CORROSION RESISTING STEELS; TOOL AND SPECIAL STEELS; AIRCRAFT QUALITY STEELS; STAINLESS STEELS

COPPERWELD STEEL COMPANY · WARREN, OHIO

Government Fixes Prices on Iron And Steel Scrap

• • • **A price schedule** establishing ceiling prices for various grades of iron and steel scrap was issued April 3 by Leon Henderson, Commissioner of Price Stabilization, National Defense Advisory Commission. Although the fixed prices date from April 3, those who acquired scrap before that date at prices higher than the maximum prices established by the price schedule are given one week, or until April 10, for carrying out such contracts. On and after April 10 the prices, which are published herewith, will apply to all transactions.

Commissioner Henderson stated that this action has been made necessary by speculative activity which has put "inflationary pressure on iron and steel scrap prices during the last few months."

The price action follows months of study by the Price Stabilization Division. In the course of its survey all branches of the industry have been consulted.

"It has been apparent," says Mr. Henderson, "that many practices of the industry, particularly with respect to the maintenance of price differentials and with respect to distribution, are badly in need of change. This schedule, however, does not attempt to correct or endorse existing practices.

"In January I asked the industry to cooperate with the government in its effort to prevent runaway prices. For the most part, the response to my request has been wholehearted. Some persons in the industry, however, have been continuing their speculative practices at the expense of those who have cooperated. This price schedule is our answer to the speculators.

"Some of the large makers of scrap have been demanding from the dealer prices so high that it was impossible to get the scrap to the open hearth at a reasonable figure. The ceilings fixed in this schedule will discourage hoarding and thus aid in securing the needed supply of scrap. The ceilings are established at a level which will insure a fair return to all persons in the industry, requiring the maker to stand a reduction from the prices which have prevailed."

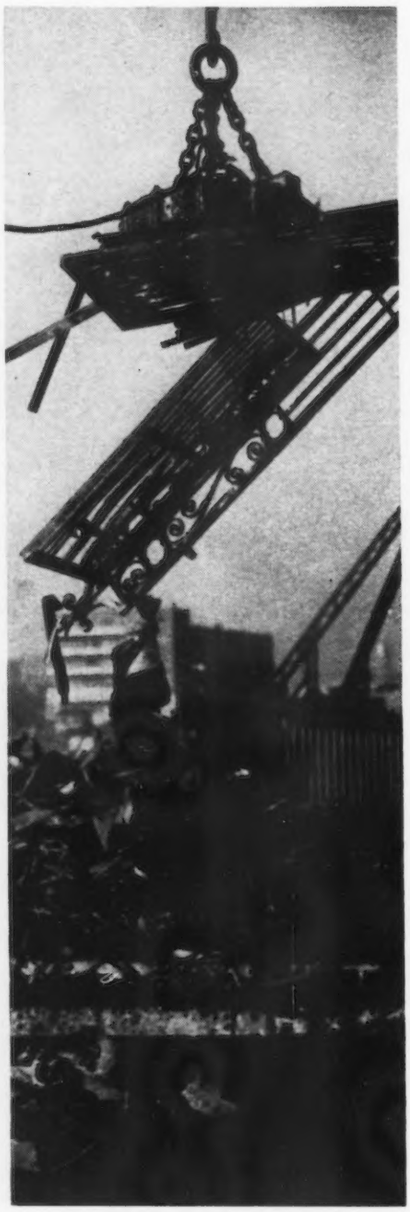


Photo by Harris-Ewing

SCRAP FOR BOMBS: At one of the large London scrap yards, steel girders from wrecked buildings, mattress springs and other metal objects are being hastily collected for use in manufacturing bombs. Britons are told: "Your old bicycle may be dropped on Berlin."

Three price schedules have been adopted. One is for iron and steel scrap other than that of railroad origin; another is for iron and steel railroad scrap, and the third is for scrap for export. All prices are based on $20 at Pittsburgh for No. 1 heavy melting steel, with differentials below that fixed for every point of consumption and with corresponding prices for various other grades. No. 1 railroad heavy melting steel is fixed at $1 above ordinary No. 1 steel. Unprepared yard scrap is established at $2.50 a ton less than the prices fixed for each grade.

Maximum export prices at Atlantic Coast ports are the maximum prices established for the domestic consumer, less transportation charges f. a. s. point of export and plus a charge of $1 to cover various expenses incident to exporting. Cast scrap prices are fixed in relation to pig iron prices at point of consumption. On No. 1 cupola cast the differential under the pig iron price is to be $2 a ton; on heavy breakable cast $3.50, and on stove plate $7.

The price schedules are binding on buyers as well as sellers. All persons engaged in buying and selling iron and steel scrap are required to keep complete records of all transactions and monthly inventories. Consumers will be required to report their purchases, the amount melted and the relationship of scrap purchased during the month to the ingot production for that month.

Agents or brokers are permitted to charge a commission of 3 per cent of the maximum prices established. "Thus the ceiling price remains available for transportation handling and purchase from the maker and the dealers," says the statement.

These price schedules will be "rigorously enforced," said Mr. Henderson. "The powers of the government to place compulsory orders, to condemn or requisition properties, to issue priorities and to use other powers available for carrying out the defense program will be exerted to the utmost against any person who may venture to disregard the maximum ceiling prices established by this schedule."

The resolution adopted by the Price Stabilization Division states that "it appears that the establishment of maximum price standards is necessary to facilitate cooperation with the government

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MASS PRODUCTION

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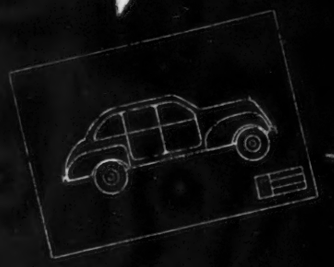

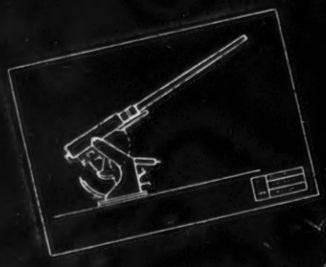

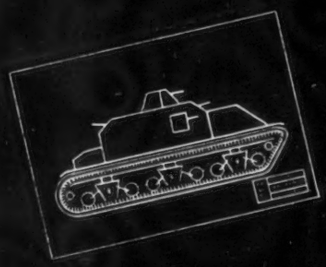

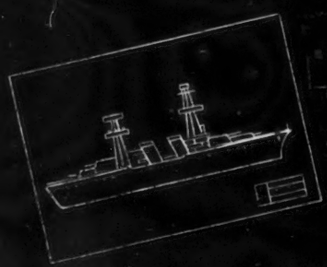

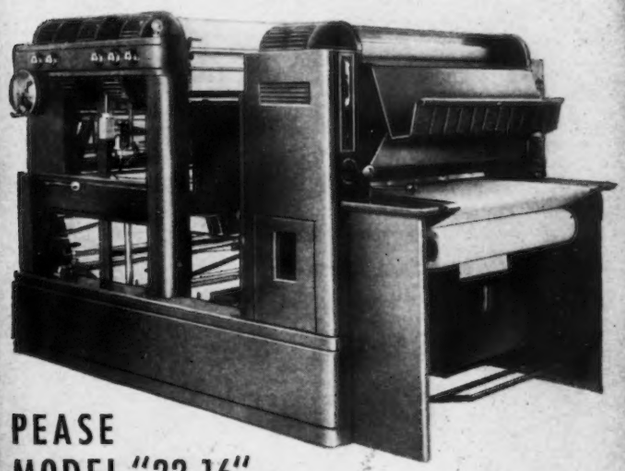

PEASE MODEL "22-16"

Makes Blueprints *faster*—20 feet per minute . . . *better*—deep blue background, sharp white line prints . . . at *lower cost*—due to these exclusive, outstanding features . . .

★ **Sliding "Vacuum-Like" Contact** smoothes out tracing inequalities, gives 24¾" uninterrupted exposure area and, for example, prevents printing a "3" as a "9." ★ **Three Speed Lamp Control** allows the lamps to be operated at 10, 15 or 20 amperes, doing away with running speed and dryer heat changes. ★ **Actinic "No-Break" Arc Lamps** burn for 45 minutes without a break and resume instantaneously. ★ **Horizontal Water Wash** floats prints free from tension, prevents wrinkles and eliminates stained prints and virtually all bleeding. ★ **Quick Change Chemical Applicator System** allows change from Blueprints to Negatives, or vice versa, in 30 seconds, and provides only method of applying potash to one side of paper, thus eliminating yellow stains. ★ **Aluminum Drying Drums,** five 8" diameter drums thermostatically controlled, heated either by gas or electricity, allow gradual drying, resulting in "prints as flat as hung wallpaper."

Model "22-16" is made in 42" and 54" sizes; write for descriptive literature. Pamphlets on lower capacity Pease Blueprinting Equipments will also be sent upon request. No obligation.

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Appendix A

MAXIMUM PRICES FOR IRON AND STEEL SCRAP OTHER THAN RAILROAD SCRAP

For Use in Steel Works and Blast Furnaces
Per Gross Ton, Delivered to the Consuming Point

GRADES [a] / DISTRICTS →	Pittsburgh [1]	Youngstown [2]	Chicago [3]	Eastern Pa. [4]	Cleveland *	Buffalo *	Southern Ohio [5]	St. Louis *	Detroit *	Duluth *	Birmingham [6]	New England [7]	Pacific Coast [8]
No. 1 Heavy melting steel (base)	20.00	20.00	18.75	18.75	19.50	19.25	18.50	17.50	17.85	18.00	17.00	15.50	14.50
No. 1 Hydraulic compressed black sheet scrap	20.00	20.00	18.75	18.75	19.50	19.25	18.50	17.50	17.85	18.00	17.00	15.50	14.50
No. 2 Heavy melting steel	19.00	19.00	17.75	17.75	18.50	18.25	17.50	16.50	16.85	17.00	16.00	14.50	13.50
Dealers' No. 1 bundles	19.00	19.00	17.75	17.75	18.50	18.25	17.50	16.50	16.85	17.00	16.00	14.50	13.50
Dealers' No. 2 bundles	18.00	18.00	16.75	16.75	17.50	17.25	16.50	15.50	15.85	16.00	15.00	13.50	12.50
Mixed borings and turnings	15.50	15.50	14.25	14.25	15.00	14.75	14.00	13.00	13.35	13.50	12.50	11.00	10.00
Machine shop turnings	15.50	15.50	14.25	14.25	15.00	14.75	14.00	13.00	13.35	13.50	12.50	11.00	10.00
Shoveling turnings	16.50	16.50	15.25	15.25	16.00	15.75	15.00	14.00	14.35	14.50	13.50	12.00	11.00
No. 1 Busheling	19.50	19.50	18.25	18.25	19.00	18.75	18.00	17.00	17.35	17.50	16.50	15.00	14.00
No. 2 Busheling	15.50	15.50	14.25	14.25	15.00	14.75	14.00	13.00	13.35	13.50	12.50	11.00	10.00
Cast iron borings	15.50	15.50	14.25	14.25	15.00	14.75	14.00	13.00	13.35	13.50	12.50	11.00	10.00
Uncut structural and plate scrap	19.00	19.00	17.75	17.75	18.50	18.25	17.50	16.50	16.85	17.00	16.00	14.50	13.50
Low phos billet and bar crops and punchings	25.00	25.00	23.75	23.75	24.50	24.25	23.50	22.50	22.85	23.00	22.00	20.50	19.50

1. In this district are all the consuming points in the Pittsburgh switching district and in Wheeling, W. Va.; Follansbee, W. Va.; Toronto, Steubenville and Martins Ferry, Ohio.
2. In this district are all the consuming points in the Youngstown switching district and in Farrell and Sharon, Pa.; Lowellville, Warren, Canton and Massillon, Ohio.
3. In this district are all the consuming points in the Chicago switching district and in Kokomo, Ind.; Peoria and Sterling, Ill.
4. In this district are all the consuming points in eastern Pennsylvania and in Delaware and Maryland.
5. In this district are all the consuming points in the switching districts of Portsmouth and Middletown, Ohio; Newport and Ashland, Ky.
6. In this district are all consuming points in the Birmingham switching district. The prices set forth are for scrap delivered to a Birmingham consuming point, excepting scrap for Birmingham consumption originating west of the Mississippi River. In the latter case the Birmingham consumer may pay $1 more than the prices indicated under "Birmingham."
7. This district includes Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. and all other consuming points in New England.
8. This district includes all consuming points on and near the Pacific Coast.

*These districts include all consuming points within their respective switching districts.

---

a. The grades specified are, except Dealers' No. 1 and No. 2 bundles and uncut structural and plate scrap, as named and defined in the simplified practice recommendations R-580-36 of the Department of Commerce which shall be the governing specifications for iron and steel scrap hereunder.
b. These grades represent the major classifications of iron and steel scrap. The maximum prices of subordinate grades within these major grade classifications shall not exceed the differentials established for the major grades.
c. Consumers located at any consuming district not listed herein shall be subject to the differential established for the nearest consuming district set out in this Schedule.

Appendix B

MAXIMUM PRICES FOR IRON AND STEEL SCRAP ORIGINATING FROM RAILROADS

Per Gross Ton, Delivered to the Consuming Point

GRADES [a] / DISTRICTS →	Pittsburgh [1]	Youngstown [2]	Chicago [3]	Eastern Pa. [4]	Cleveland *	Buffalo *	Southern Ohio [5]	St. Louis *	Detroit *	Duluth *	Birmingham [6]	New England [7]	Pacific Coast [8]
No. 1 Railroad grade heavy melting steel	21.00	21.00	19.75	19.75	20.50	20.25	19.50	18.50	18.85	19.00	18.00	16.50	15.50
Scrap rails	22.00	22.00	20.75	20.75	21.50	21.25	20.50	19.50	19.85	20.00	19.00	17.50	16.50
Rerolling quality rails	23.50	23.50	22.25	22.25	23.00	22.75	22.00	21.00	21.35	21.50	20.50	19.00	18.00
Scrap rails 3-ft. and under	24.00	24.00	22.75	22.75	23.50	23.25	22.50	21.50	21.85	22.00	21.00	19.50	18.50
Scrap rails 2-ft. and under	24.50	24.50	23.25	23.25	24.00	23.75	23.00	22.00	22.35	22.50	21.50	20.00	19.00
Scrap rails 18-in. and under	25.00	25.00	23.75	23.75	24.50	24.25	23.50	22.50	22.85	23.00	22.00	20.50	19.50

a. The grade differentials set out in Appendix A are not applicable to iron or steel railroad scrap.
b. Where a consumer is located in a consuming district not named above, the maximum price applicable to such consumer shall be the price listed for the nearest consuming district set out above. Where the railroad maker operates in 2 or more consuming districts, the maximum applicable to the sale of railroad scrap on the line shall be the highest maximum for any consuming point on the line.

No. 1 cupola cast	Maximum price to be not more than $2 per gross ton under the price of No. 2 foundry pig iron delivered at the same point.
Heavy breakable cast	Maximum price to be not more than $3.50 per gross ton under the price of No. 2 foundry pig iron dlivered at the same point.
Stove plate	Maximum price to be not more than $7 per gross ton under the price of No. 2 foundry pig iron delivered at the same point.

All unprepared yard scrap shall be sold at prices not exceeding $2.50 less than the maximum prices set out above

1. In this district are all the consuming points in the Pittsburgh switching district and in Wheeling, W. Va.; Follansbee, W. Va.; Toronto, Steubenville and Martins Ferry, Ohio.
2. In this district are all the consuming points in the Youngstown switching district and in Farrell and Sharon, Pa.; Lowellville, Warren, Canton and Massillon, Ohio.
3. In this district are all the consuming points in the Chicago switching district and in Kokomo, Ind.; Peoria and Sterling, Ill.
4. In this district are all the consuming points in eastern Pennsylvania and in Delaware and Maryland.
5. In this district are all the consuming points in the switching districts of Portsmouth and Middletown, Ohio; Newport and Ashland, Ky.
6. In this district are all consuming points in the Birmingham switching district. The prices set forth are for scrap delivered to a Birmingham consuming point, excepting scrap for Birmingham consumption originating west of the Mississippi River. In the latter case the Birmingham consumer may pay $1 more than the prices indicated under "Birmingham."
7. This district includes Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I., and all other consuming points in New England.
8. This district includes all consuming points in California, Oregon and Wash.

*These districts include all consuming points within their respective switching districts.

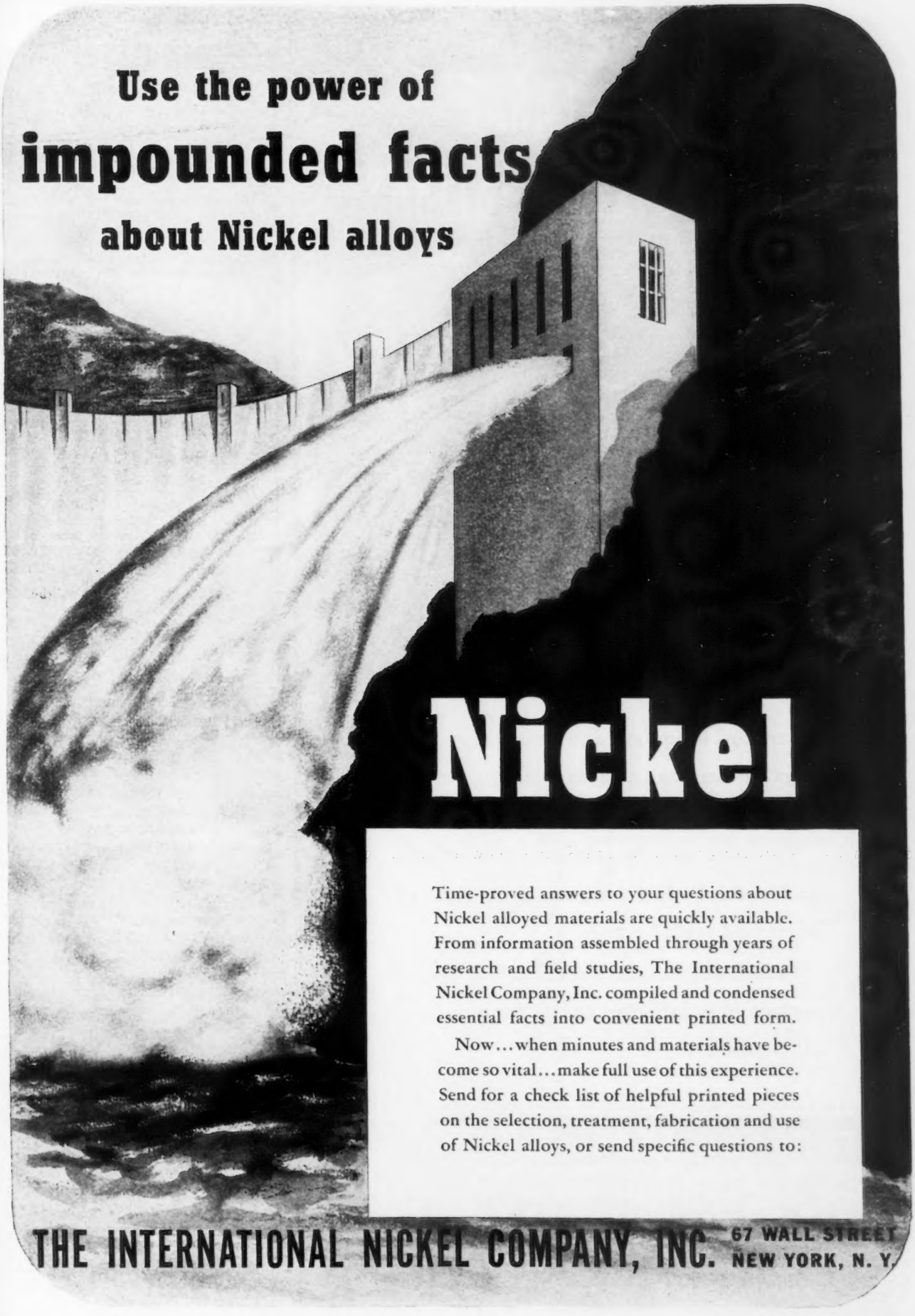
Appendix C

Maximum Prices for Iron and Steel Scrap for Export from the United States

Per Gross Ton, F.A.S. Point of Export

The maximum export prices applicable to iron and steel scrap, including scrap of railroad origin, f.a.s. at all ports located on the Atlantic Coast shall be the maximum prices for the grades of scrap as shown (1) under Appendix A and (2) under Appendix B for the nearest domestic consuming district, less the transportation charges to the f.a.s. point of export, plus a uniform charge of $1 per gross ton.

At all United States ports located on the Gulf of Mexico, the maximum price for No. 1 heavy melting steel shall be $15 per gross ton f.a.s., point of export plus $1 per gross ton. For all other quality classifications the differentials for grade as outlined in Appendix A and as set forth and determined under Appendix B shall be applied to $15 as a base and $1 added to obtain the maximum prices.



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BALDWIN SOUTHWARK DIVISION • THE PELTON WATER WHEEL COMPANY
BALDWIN DE LA VERGNE SALES CORP. • THE WHITCOMB LOCOMOTIVE COMPANY
THE MIDVALE COMPANY • CRAMP BRASS AND IRON FOUNDRIES DIVISION

Will Scrap Price Fixing Plan Work?

Whether the price fixing arrangement on iron and steel scrap is a workable one that will bring out a sufficient quantity of scrap for the present large requirements is a question which can only be determined by "the test of time," according to Edwin C. Barringer, executive secretary of the Institute of Scrap Iron and Steel.

"We are not advocating an upward spiral in price," said Mr. Barringer, "but do urge a price level that will be adequate to bring out the tonnage required to maintain peak operations by the mills. The combination of reduced ceiling prices on iron and steel scrap with the differentials will take $1 to $3 a ton from the price paid to the producers, depending on the area, and this may do much to discourage reclamation of this vital and important defense material. Nearly 17,000,000 tons of the 30,000,000 gross tons of market scrap required in 1941 is dependent largely upon a price in order to bring it out. . . . . In view of the higher wages being paid, there is danger that many of the scrap collectors will be diverted to other branches of defense activity."

and prevention of a price policy tending to weaken the defense effort through disastrous inflation, undue burdens on the government, economic dislocations, price spiraling, and profiteering, and the establishment of such standards is otherwise necessary in the public interest and in the interest of national defense."

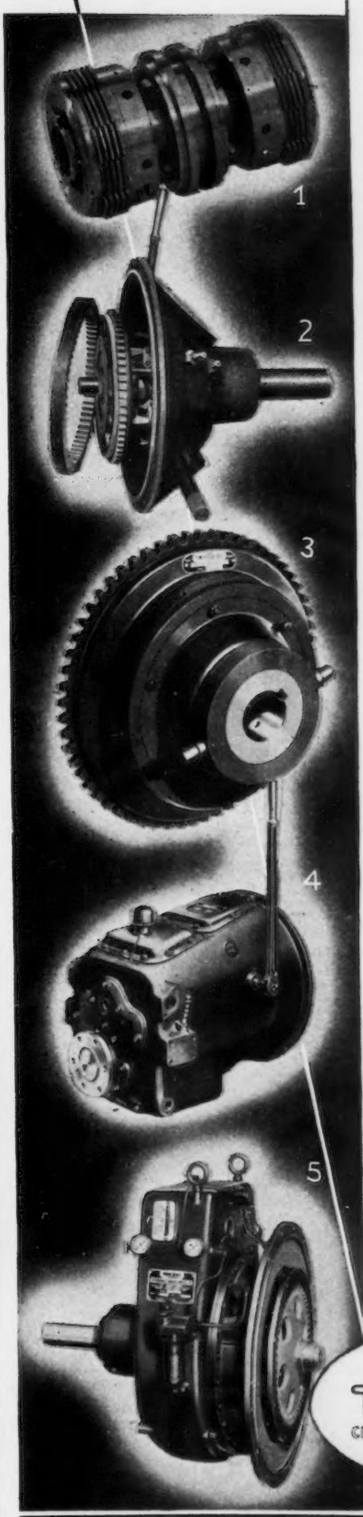
Commissions shall be allowed to brokers or agents only under the following conditions: (a) The agent or broker guarantees the quality and delivery of an agreed tonnage of the scrap; (b) the commission is shown as a separate charge in the billing; (c) the scrap is invoiced at a price not higher than the maximum applicable herein; (d) no dealer or broker splits or divides the commission allowed him by a consumer with any other dealer, broker or consumer.

Price limitations shall not be evaded, the statement says, either by direct or indirect methods, such as the purchase or sale of any other materials or by any service or other charge or by any tying agreement or trade understanding or otherwise.

Photo by News of the Day Newsreel from Inter'l

PICKETS AND THE LAW: A policeman carries on a running, rolling argument with a CIO picket at the International Harvester Co.'s, Richmond, Ind., plant, recently reopened after a strike. The picket took the officer's club and hat. A feature of recent strikes in U. S. industries has been the beating of policemen.

Dependable uniformity



● One big reason why machine tool builders and other manufacturers of power driven machinery choose Twin Disc standard clutch units is because they know that every clutch will be the twin of its predecessor . . . that all parts are interchangeable without filing or fitting . . . that these factory-built parts are immediately available in 28 key cities throughout the country.

Add to this, 23 years of specialized experience in building clutches whose performance meets specifications with a wide margin of safety and you will realize why Twin Disc Clutches are standard with so many nationally-known machinery manufacturers.

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2. Power Take-off
3. Model E Heavy-duty Clutch
4. Marine Reverse and Reduction Gear
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"BUDGITS" come in sizes to lift loads up to 250, 500, 1000, and 2000 pounds with speeds to suit today's needs. Prices start at $119.00.

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Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . Send all your crane and hoist inquiries to Shaw-Box!

Government Awards

Government awards, during the week ended March 29, 1941, as listed by the Public Contracts Division, Department of Labor, follow:

Iron and Steel Products. . . . $16,463,744

Apple Mfg., Dayton, Ohio; container assy. $12,375
American-La France-Foamite Corp., Elmira, N. Y.; oxygen cylinders 157,730
American Rolling Mill Co., Middletown, Ohio; steel pipe 315,786
American Steel & Wire Co. of N. J., Boston; steel 34,675
Anthracite Bridge Co., Scranton, Pa.; steel for conveyor bridges. 28,791
Atlas-Ansonia Co., New Haven, Conn.; fuze parts 59,400
Baldt Anchor, Chain & Forge Corp., Chester, Pa.; anchor chains 401,215
Bethlehem Steel Co., Bethlehem, Pa.; projectiles 25,000
manganese-molybdenum 15,771
breech rings forgings 19,430
Bridgeport Brass Co., Bridgeport, Conn.; cartridge cases 49,500
Carroll Chain Co., Columbus, Ohio; chains 40,690
Chase Brass & Copper Co., Inc., Waterbury, Conn.; soap boxes .. 29,500
Cleveland Pneumatic Tool Co., Cleveland; air hose fittings 14,780
Columbia Steel Co., San Francisco; reinforcement bars 28,000
Connery Construction Co., Philadelphia; stack and breechings, ducts, etc. 23,150
Crane Co., Philadelphia; steel valves 53,800
Crucible Steel Co. of America, New York; strip steel 10,746
bar steel 26,310
Dayton Mfg. Co., Dayton, Ohio; illuminated message containers. 22,820
Delco Prod. Div. of Gen. Motors Corp., Dayton, Ohio; tail bomb fuze 445,656
Dravo Corp., Pittsburgh; gate vessels 3,582,000
Charles Fischer Spring Co., Brooklyn; casing, shafting, etc. 17,570
Gen. Drop Forge Co., Inc., Buffalo; steel forgings 14,680
Gould-Mersereau Co., Inc., New York; bolts 10,600
Greene-Wolf Co., Inc., Brooklyn; steel welding pipe 13,282
Haarmann Steel Co., Holyoke, Mass.; structural steel 17,995
International Stacey Corp., Columbus, Ohio; galvanized steel for switch structures 29,560
H. L. Judd Co., New York; thumb nuts 19,500
Walter Kidde & Co., Inc., New York; oxygen cylinders 424,653
Lakeside Bridge & Steel Co., Milwaukee, Wis.; steel trash racks 13,634
Morton Mfg. Co., Chicago; ammunition chests 260,025
Mosler Safe Co., Hamilton, Ohio; safes 41,980
Muskogee Iron Works, Muskogee, Okla.; fabricated structural steel 343,490
Nashville Bridge Co., Nashville, Tenn.; structural steel 230,470
National Cash Register Co., Dayton, Ohio; dummy fuzes 10,490
National Lock Washer Co., Newark; stops, packing for fiber containers 48,928
National Tube Co., Washington; steel seamless tubing 27,097
Norris Stamping & Mfg. Co., Los Angeles; cartridge containers .. 1,336,580
Petroleum Equipment Co., San Francisco; forged steel flanges. 17,378
Pheoll Mfg. Co., Chicago; screws. 20,740
Pittsburgh Steel Co., Pittsburgh; steel tubing 10,156
Pollak Mfg. Co., Arlington, N. J.; cartridge containers 210,140
Republic Steel Corp., Massillon, Ohio; steel 102,218
Rochester Ropes, Inc., Jamaica, N. Y.; steel cable 38,880
Scovill Mfg. Co., Waterbury, Conn.; tooth brush containers 21,850
gold color metal buttons 186,279
Standard Pressed Steel Co., Jenkintown, Pa.; conveyors; engine parts 12,523
Steel Improvement & Forge Co., Cleveland; steel forgings 40,020
Steel Scaffolding Co., Inc., Evansville, Ind.; scaffolding ..... Indefinite
Storms Drop Forging Co., Springfield, Mass.; forgings 22,966
S. G. Taylor Chain Co., Hammond, Ind.; chains 11,733
Tennessee Coal, Iron & Railroad Co., Birmingham; reinforcing steel 22,957
forging shell 5,823,600
Trenton Pipe Nipple Corp., Trenton, N. J.; brass nipples 20,036
Tubular Service Corp., Cambridge, Mass.; steel tubes 11,614
Uchtorff Co., Davenport, Iowa; ammunition chests 291,598
Uff Machine Co., Upland, Pa.; stuffing tubes 17,112
Waterbury Button Co., Waterbury, Conn.; gold color metal buttons 83,759
Wright Machine Co., Worcester, Mass.; boosters 1,100,070
Zallea Brothers & Johnson, Wilmington, Del.; strainer baskets. 68,189

Nonferrous Metals & Alloys $1,122,537

American Brass Co., Waterbury, Conn.; copper-nickel tubing ... $35,396
American Smelting & Refining Co., Denver; cathode copper 10,248
Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass rod, commercial 51,343
copper-nickel alloy tubing 22,776
copper tubing 13,185
bullet jacket cups 547,018
L. A. Cohn & Brother, Inc., Chicago; bearing bronze pig metal. 10,470
Crouse-Hinds Co., Syracuse, N. Y.; lamp assys. 55,948
Delta Electric Co., Marion, Ind.; hand lanterns 66,840
General Electric Supply Corp., Dayton, Ohio; fluorescent lamp fixtures 24,454
Magna Mfg. Co., Inc., New York; flat shavings magnesium 24,890
magnesium powder 20,850
Metal Reduction Corp. of N. J., North Bergen, N. J.; bronze ingots 60,700
Multiplex Display Fixture Co., St. Louis; displayers 13,094
Reed & Barton Corp., Taunton, Mass.; tableware 51,502
Reynolds Metals Co., Louisville, Ky.; aluminum alloy 36,619
Vernon Co., New York; braided cable 72,250

Other Machinery $7,830,243

Ace Fastener Corp., Chicago; paper fastening machines $13,200
Aerial Machine & Tool Corp., New York; trigger motor units 29,250
American Foundry & Furnace Co., Bloomington, Ill.; hot air heating units 18,468
American Tool Works Co., Cincinnati; drills 54,082
Baldwin-Southwark Div., Baldwin Locomotive Works, Philadelphia; testing machine 10,210
Barrett Equipment Co., St. Louis; brake drum lathes 33,625
Buda Co., Harvey, Ill.; connecting rods 16,088
Caterpillar Tractor Co., Peoria, Ill.; power driven graders 52,071
tractors 48,646

GOVERNMENT AWARDS

Champion Shoe Machinery Co., St. Louis; shoe repairing machs. .. 10,854
Chicago Metal Hose Corp., Maywood, Ill.; steel fuel oil hose .. 26,626
C. B. Christiansen, Newark; ring storage rods 14,940
Clayton & Lambert Mfg. Co., Detroit; eng. gasoline heaters 25,731
Colt's Patent Fire Arms Mfg. Co., Hartford; parts for revolvers .. 84,470
Cone Automatic Machine Co., Inc., Windsor, Vt.; screw machine .. 28,196
Cooper-Bessemer Corp., Mt. Vernon, Ohio; compressors and motors 357,690
Copeland Refrigerator Corp., Sidney, Ohio; refrigerators and accessories ..... Indefinite
Crosbie Co., Washington; portable electric grinders ..... Indefinite
Detroit Aluminum & Brass Corp., Detroit; parts for diesel engines 20,158
Edmos Products Corp., Brooklyn; cleaning staff 20,424
Electric Boat Co., Groton, Conn.; parts for main eng. 19,500
Ellis Drier Co., Chicago; laundry equipment 11,100
Exact Weight Scale Co. Columbus, Ohio; scales 21,645
Ex-Cell-O Corp., Detroit; parts for diesel engines 17,060
Gardner Denver Co., New York; air compressor 12,657
General Electric Supply Corp., Washington; refrigerators and accessories ..... Indefinite
General Motors Corp., Cleveland Diesel Engine Div., Cleveland; parts for diesel engines 21,175
General Steel Castings Corp., Eddystone, Pa.; steel castings 346,820

Photo by International

BOMB EXTINGUISHER: Anti-fire guns like those held by this Englishwoman are used to extinguish incendiary bombs. The guns discharge a powder compound and spare charges are carried in a canister.

Gilbert & Barker Mfg. Co., Springfield, Mass.; water chests 96,271
Gisholt Machine Co., Madison, Wis.; balancing machine 11,350
C. H. Gosiger Mach. Co., Dayton, Ohio; drill presses 23,800
Graham Paige Motors Corp., Detroit; piece parts 271,974
Hevi Duty Elec. Co., Milwaukee, Wis.; elec. furnace 13,200
Howard Foundry Co., Chicago; protecting cap assys. 450,800
Imperial Machine & Foundry Corp., Long Island, N. Y.; vegetable peeling machines 29,492
Ingersoll-Rand Co., Washington; bits ..... Indefinite
Inserting & Mailing Mach. Co., Phillipsburg, N. J.; inserting machs 11,272
International Postal Supply Co., Brooklyn; canceling machines .. 13,930
Jeffery Mfg. Co., Columbus, Ohio; conveyor system and coal crusher 61,255
Jones & Lamson Machine Co., Springfield, Vt.; semi-automatic lathes 17,758
Koppers Co., Baltimore; semi-water gas plant 429,035
Landis Tool Co., Waynesboro, Pa.; elec. grinder 110,440
Link-Belt Co., Chicago; car dumper 44,743
Machinery Builders, Inc., Long Island City, N. Y.; presses, loading 26,685
MacNeil Machinery Co., Norfolk, Va.; rebuilt machinery 12,438
MacWhyte Co., Kenosha, Wis.; tie rods 38,738
McKiernan-Terry Corp., Harrison, N. J.; anchor windlass 260,773

UNAMATIC PROCESS

DUAL HEAD MOUNTING
Eliminates Residual Stresses

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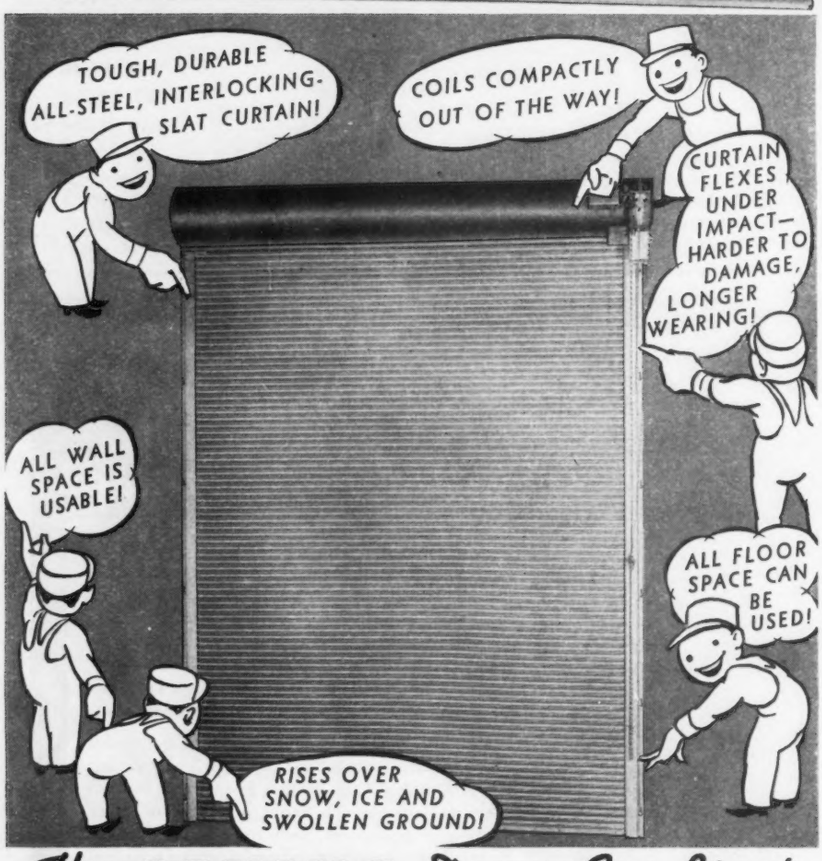
BETTER — AND FROM 3 TO 4 TIMES FASTER THAN MANUAL WELDING

Mercer Engineering Works, Inc., New York; two-wheel trucks .. 19,054
Mercury Mfg. Co., Chicago; elec. trucks 49,125
James M. Motley & Co., Inc., New York; bolt heading and forging machine 13,100
Nash-Kelvinator Corp., Detroit; refrigerators and accessories ... Indefinite
Noble & Westbrook Mfg. Co., East Hartford; marking machines ... 13,260
Northwest Engineering Co., Chicago; dragline excavators 33,494
Northwest Stove Works, Inc., Portland; hot air heating units. 11,858
Pacific Marine Supply Co., Seattle; portable pumps 64,898
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford; jig borer machine 16,286
reaming machine 16,716
shell gages 13,000
Reed Prentice Corp., Worcester, Mass.; routing, milling machines 22,352
Rock Bit Sales & Service, Inc., Philadelphia; drills ..... Indefinite
Sauerman Brothers, Chicago; storage and reclaiming system 31,680
William Sellers & Co., Inc., Philadelphia; boring machines 3,299,169
Servel, Inc., Evansville, Ind.; refrigerators and accessories .... Indefinite

107.5% Operating Rate Reached By Inland

• • • Inland Steel Co.'s ingot production again established a new record high in the month of March. Ingots produced totaled 301,386 net tons which was at the rate of 107.5 per cent of rated capacity of 3,300,000 net tons a year. The previous record of 297,381 net tons was established in January of this year.

KINNEAR
ROLLING DOORS
THE SAVING WAYS IN DOORWAYS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COILS COMPACTLY OUT OF THE WAY!
CURTAIN FLEXES UNDER IMPACT—HARDER TO DAMAGE, LONGER WEARING!
ALL WALL SPACE IS USABLE!
ALL FLOOR SPACE CAN BE USED!
RISES OVER SNOW, ICE AND SWOLLEN GROUND!

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Silent Hoist Winch & Crane Co., Brooklyn; tractor cranes 18,775
Simmons Machine Tool Corp., Albany, N. Y.; lathe equipment .. 23,113
Smith & Wesson, Inc., Springfield, Mass.; parts for revolvers 139,640
Sullivan Machinery Co., New York; bits ..... Indefinite
Taft-Peirce Mfg. Co., Woonsocket, R. I.; gage assy. 12,850
H. M. Thermo Control Co., Los Angeles; post assys. 71,550
Harold E. Trent Co., Philadelphia; elec. oven 21,330
Thomas Truck & Caster Co., Keokuk, Iowa; platform truck .... Indefinite
Union Steel Castings Div., Blaw-Knox Co., Pittsburgh; armor steel gun implacements 34,000
U. S. Electrical Motors, Inc., Brooklyn; test stands 59,202
U. S. Hammered Piston Ring Co., Inc., Stirling, N. J.; piston rings 38,066
U. S. Pipe & Foundry Co., New York; cast iron pipe 10,732
Vapor Car Heating Co., Inc., Chicago; steam generating units .. 33,790
Vinco Corp., Detroit; gage assy.. 22,050
Warner Elevator Mfg. Co., Cincinnati; elec. elevator 11,195
Westinghouse Electric & Mfg. Co., Washington; refrigerators and parts ..... Indefinite
Wiedemann Machine Co., Philadelphia; gages 12,946
Winchester Repeating Arms Co., Div. of Western Cartridge Co., New Haven; 0.22 rifles 161,745
Wisconsin Axle Div. of Timken-Detroit Axle Div., Oshkosh, Wis.; gears, kits, etc. 39,038
Worthington Pump & Mach. Corp., Boston; steam driven gas circulators 94,356
Yale & Towne Mfg. Co., Philadelphia; 2-wheel drive tractors ... 21,262
elec. trucks 90,121
York Ice Machinery Corp., York, Pa.; piece parts 71,822

War Dept., Ordnance:

Advance Pressure Castings, Inc., Brooklyn; booster cups $4,704
Aluminum Co. of America, Washington; aluminum strip 1,719
aluminum alloy, sheet 1,161
American Car & Foundry Co., New York; automotive equipment 5,863
American Machine & Metals, Inc., East Moline, Ill.; machine 1,025
Arrow Tool & Reamer Co., Detroit; cutters 1,501
end mills 1,360
Auto-Ordnance Corp., Bridgeport, Conn.; small arms materiel .. 2,342
Baker Wood Preserving Co., Marion, Ohio; ties, switch 4,895
Barber-Colman Co., Machine & Small Tool Div., Rockford, Ill.; hobs, high speed steel 7,295
tools, cutting 5,007
reamers 5,654

Photo by Wide World

GUN CREWS, wearing gas masks, man one of the modern 6-in. guns at Fort Andrews, Boston.

Bendix Aviation Corp., Scintilla Magneto Div., Sidney, N. Y.; parts for light tanks 6,569
Bethlehem Steel Co., Bethlehem, Pa.; forgings 19,430
E. W. Bliss Co., Brooklyn; presses 25,431
Boston & Lockport Block Co., Boston; blocks and tackle 4,100
Boyar-Schultz Corp., Chicago; gages 2,350
Breeze Corp., Inc., Newark; starters 6,800
Brown & Sharpe Mfg. Co., Providence; end mills 1,722
tools 1,071
Charles Bruning Co., Inc., Long Island City, N. Y.; file units .. 1,988
Candler-Hill Corp., Detroit; pumps, fuel 1,125
Carboloy Co., Inc., Detroit; tools. 8,352
Carnegie-Illinois Steel Corp., Chicago; steel, chromium vanadium 2,222
steel, nickel 8,275
Carpenter Steel Co., Reading, Pa.; steel 1,535
Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass rod .. 3,222
brass 3,476
bands, rotating 3,952
C. B. Christiansen, Newark; tools. 5,880
Cleveland Cutter & Reamer Co., Cleveland; tools 9,279
Cleveland Twist Drill Co., Cleveland; tools 2,211
drills 1,196
Cleveland Universal Jig Co., Cleveland; fixtures, machine 1,732
Columbus Bolt Works Co., Columbus, Ohio; automotive equipment 1,386
Continental Tool Works, Detroit; cutters 2,120
Crucible Steel Co. of America, Chicago; drill rods 3,717
Detroit Tap & Tool Co., Detroit; gages, thread 2,456
Diamond Specialty & Supply Co., Philadelphia; drills 1,357
Henry Disston & Sons, Philadelphia; saw steel 3,581
Eclipse Air Brush Co., Inc., Newark; motors 1,790
Edmos Products Co., Brooklyn; artillery materiel 20,424
Ex-Cell-O Corp., Continental Tool Works Div., Detroit; mills, hollow, high speed steel 3,580
tools, cutting 6,035
mills 1,620
Fairmont Aluminum Co., Fairmont, W. Va.; sheets, aluminum 3,439
Ferracute Machine Co., Inc., Bridgeton, N. J.; measuring equipment 1,939
Firth-Sterling Steel Co., Philadelphia; steel 1,186
dies 5,700
General Elec. Co., Schenectady; capacitor equipment 6,363
Goddard & Goddard Co., Inc., Detroit; cutters 1,032
B. W. Greeff & Co., Inc., New York; magnesium 15,650
Greenfield Tap & Die Corp., Greenfield, Mass.; gages 1,874

THE AIRLESS

"Roto Blast"

"IT CLEANS FAST!"

FOR SPECIAL AUTOMATIC — AS WELL AS ALL GENERAL FOUNDRY BLAST CLEANING

SPECIAL TABLE BARREL

71 CONCERNS—including Ford, Bethlehem, American Steel Foundries, Buick, Baldwin Locomotive, etc.—in the last six months of 1940 placed orders ranging from $5189.00 to $37,000.00 (26 from $10,000.00 to $20,000.00—11 from $20,000.00 to $37,000.00) for Pangborn equipment. Many others were received from $4995.00 downward. January and February, 1941, including March to press date, shows continued acceleration.

Perhaps you too have an application that calls for a ROTOBLASTING engineer's study—or a ROTOBLAST quotation? Let us show why—for quick production, lowest cost operation and economical service—you should choose ROTOBLAST. Write to Pangborn—today.

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WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION . . . HAGERSTOWN, MARYLAND

H. K. Metal Craft Mfg. Corp., New York; supports, steel 1,902
Hadley Special Tool Co., Inc., Boston; adapters 4,504
Hannifin Mfg. Co., Chicago; riveters, portable 1,250
Louis Hanssen's Sons, Davenport, Iowa; screws and wrenches 1,301
Hanson-Whitney Co., Hartford; gages 19,625
Harding Machine Screw Co., East Liberty, Ohio; primer parts ... 107,020
Earl Hart Woodworking Machine Co., Chicago; rip saws 2,172
Harnischfeger Corp., Milwaukee; cranes 10,805
Heald Machine Co., Worcester; machines, grinding 9,425
Hunter Pressed Steel Co., Lansdale, Pa.; springs 2,370
Ingersoll-Rand Co., Newark; tools. 1,635
International Harvester Co., Springfield, Mass.; trucks, tractor 8,045
Jones & Laughlin Steel Corp., Pittsburgh; steel, strip 1,845
Lake City Malleable Co., Cleveland; nuts, thumb, malleable iron or steel castings 1,890
John T. Lewis & Brothers Co., Philadelphia; solder 12,012
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages 8,022
Lindberg Engineering Co., Chicago; carrier arms 9,700
furnaces 13,535
Lloyd & Arms, Inc., Philadelphia; machine, internal surface grinding 7,744
Lodge & Shipley Machine Tool Co., Cincinnati; lathes 11,157
Edward A. Lynch Machinery Co., Philadelphia; brakes 6,130
Machinery Builders, Inc., Long Island City, N. Y.; machines, assembling 14,598
machines 11,851
Mack Mfg. Corp., Long Island City, N. Y.; tranmissions 20,000
Magnus Tool & Die Co., Newark; anvils 77,017
Master Metal Products, Inc., Buffalo; chests, steel 2,946
Merrillat Road Supply Co., Monmouth, Ill.; parts for tractors .. 3,584
Micromatic Hone Corp., Detroit; tools 1,730
Modern-Bond Corp., Wilmington, Del.; tools 4,099
Modern Tool & Die Co., Philadelphia; gages 57,226
Morse Twist Drill & Machine Co., New Bedford, Mass.; tools, cutting 2,258
Mutual Wheel Co., Moline, Ill.; cables and conduit 1,908
McCrosky Tool Corp., Meadville, Pa.; bars, boring 1,074
McKiernan-Terry Corp., Dover, N. J.; machines, staking 22,390
cutters 2,599
National Mineral Co., Chicago; cranks 4,606
Niagara Machine & Tool Works, Buffalo; shears 5,067

(CONTINUED ON PAGE 101)

DoAll Saves $500 in Three Weeks

The American La France Foamite Corporation, well-known makers of fire fighting equipment, Elmira, N. Y., kept a record during a 3-weeks' period of savings effected with one Model ML DoAll. Following are only a few of the jobs done—

	Old Method	On DoAll
1	15 hours	5½ hours
2	2½ hours each	½ hour each
3	5 hours	1¼ hours
4	15 hours	2 hr. 3 min.
5	9 hours	2 hours
6	5 hours	¾ hour
7	12 hours	2 hours
8	12 hours	3 hours
9	1 hour each	15 min. each
10	2 hours	½ hour

America's

GREAT DEFENSE TOOL

The DoAll is the indispensable modern machine tool for speedy, accurate performance in handling scores of metal working jobs, formerly done on the shaper, lathe and milling machine. Now used in large and small plants everywhere to effect short cuts in making molds and dies, special tools and parts in the manufacture of armaments, motorized equipment, aeroplanes, battleship parts, etc.

Let us send a factory trained man to your plant to show you what a DoAll can do and save for you.

FREE —Literature and Handbook on Contour Machining, 158 pages of valuable metal working helps.

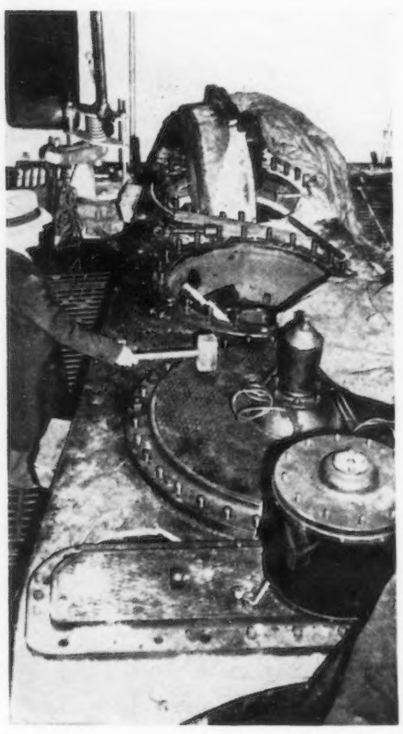
CONTINENTAL MACHINES, INC.
1911 S. Washington Ave. Minneapolis, Minn.

Band Filer

Does faster, better, smoother continuous filing on all materials from high-carbon steel to brass, wood, etc. Your choice of 21 styles of file bands, ½", ⅜" and ¼" wide—flat, oval or half round.

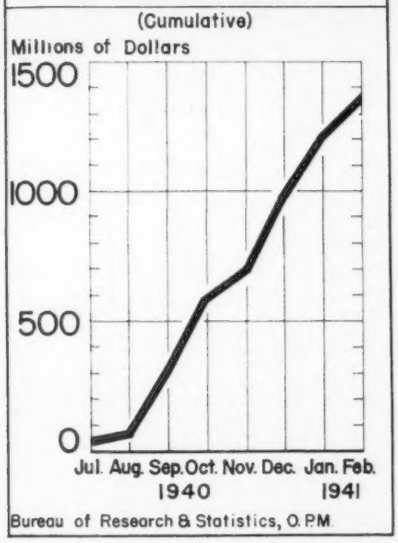
DAMAGE TO ENGINES of the S. S. Companoella, one of the Italian refugee freighters taken over by Coast Guardsmen, is shown in the picture below.

Photo by International



DEFENSE PLANT CONTRACT AWARDS

BY U. S. GOVERNMENT



——Contracts totaling $1,350,445,281 for the construction of factories, machinery and other plant facilities to prepare the nation for total defense had been signed by the United States Government, the Office of Production Management announced today. This includes plants for which the Government will pay in sixty equal instalments over a 5-year period, and those which it is building with public funds and will own outright from the start.

Niles-Bement-Pond Co., Pratt & Whitney Div., West Hartford:
machines, drilling 16,716
assemblies, drills 6,280
gages 18,100
Norton Co., Worcester, Mass.; grinding wheels 2,532
Oilgear Co., Milwaukee; presses, hydraulic 16,004
Parent Metal Products, Inc., Philadelphia; cabinets, steel 1,504
Phoenix Mfg. Co., Catasauqua, Pa.; forgings 7,273
Putnam Tool Co., Detroit; tools, cutting 20,740
R and M Mfg. Co., Royal Oak, Mich.; gages 4,258
Reliable Tool Co., Irvington, N. J.;
anvils 52,666
tools 13,941
dies 1,800
Republic Steel Corp., Cleveland; barrel blanks 13,600
Revere Copper & Brass, Inc., Baltimore; brass 77,200
Stanley P. Rockwell Co., Inc., Hartford; furnace 3,525
Rustless Iron & Steel Corp., Baltimore; steel 2,898
Joseph T. Ryerson & Son, Inc., Chicago; machine brake, steel.. 4,894
Scoville Mfg. Co., Waterbury, Conn.; artillery materiel 2,100,000
Seagram Stamping & Mfg. Co., New York; washers 1,508
Sheffield Gage Corp., Dayton, Ohio; gages 1,443
Smith & Wesson, Inc., Springfield, Mass.; small arms materiel 139,640
Somerville Machine & Foundry Co., Somerville, Mass.; castings, bronze 1,323
Standard Gage Co., Inc., Poughkeepsie, N. Y.; gage blocks ... 1,030
gages 1,884
Stanworth Tool Mfg. Co., Lebanon, Ind.; cutters 1,740
Star Engineering Works, Newark; jigs, drill 1,720
Stevens Walden, Inc., Worcester; cartridge holders 6,988
Talon, Inc., Meadville, Pa.; gages. 3,777
Timken-Detroit Axle Co., Detroit; brackets and brake mechanisms. 2,973
Thinsheet Metals Co., Waterbury, Conn.; brass, cartridge 21,060
Threadwell Tap & Die Co., Greenfield, Mass.; cutters 24,000
Thurston Mfg. Co., Providence; tools, cutting 2,109
mills and cutters 3,767
Torq Electric Mfg. Co., Cleveland; attachments, motor drive 4,321
Tools & Gages, Inc., Cleveland; gages 3,440
Trotter, Nathan & Co., Philadelphia; tin, pig 5,298
Tubular Service Corp., Pittsburgh; steel tubing 3,640
Union Spring & Mfg. Co., New Kensington, Pa.; springs 2,740

Cleaning Line Jammed?

CALL WYANDOTTE

The emphasis on high speed production puts increasing responsibility on those in charge of metal cleaning and finishing. . . . You want to produce fast. You want to keep rejects at a minimum. And you want to keep cleaning costs down.

Your Wyandotte Service Representative is a good man to call when you're in a jam. Even better to call him *before* trouble breaks. He'll be glad to cooperate at all times.

Wyandotte PRODUCTS
Service Representatives in 88 Cities

THE J. B. FORD SALES CO., WYANDOTTE, MICHIGAN

Union Twist Drill Co., Athol, Mass.; tools, cutting 3,760
cutters 3,844
Unique Specialties, Inc., New York; holders, punch guide ... 3,125
John Verduin Machine Corp., Paterson, N. J.; machines 7,695
Vinco Corp., Detroit; gages 3,106
Wallace Supplies Mfg. Co., Chicago; exhausts, manifold 1,338
Warner & Swasey Co., Cleveland; tools 2,019
Watson-Stillman Co., Roselle, N. J.; presses, hydraulic 13,650
Westinghouse Elec. & Mfg. Co., Springfield, Mass.; furnaces ... 11,684
Weston Electrical Instrument Corp., Newark; ammeters 1,824
Wiedemann Machine Co., Philadelphia; gages 2,221
Daniel Woodhead Co., New York; plugs 5,802
York Ice Machinery Corp., York, Pa.; fire control equipment ... 9,480
Youngstown Sheet & Tube Co., Chicago; tubing, seamless steel. 69,123
Zimmerman Steel Co., Bettendorf, Iowa; castings, steel 17,736

War Dept., Other Agencies:

Adams Grease Gun Corp., New York; lubricators $79,200
Alemite Co. of Maryland, Baltimore; lubricating guns 5,365
American Foundry & Furnace Co., Bloomington, Ill.; heating units. 18,468
American Steel & Wire Co. of N. J., Cyclone Fence Div., Cleveland; fence and gates 6,154
Aviation Mfg. Corp., Lycoming Div., Williamsport, Pa.; spare parts 1,513,333
Bendix Radio Corp., Baltimore; couplings 25,650
Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J.; supercharge regulator assemblies 360,255
Bonney Forge & Tool Works, Allentown, Pa.; holding tools 1,422
Buckeye Telephone & Supply Co., Cincinnati; augers 1,864
Caterpillar Tractor Co., Peoria, Ill.; graders 52,071
Curtiss-Wright Corp., Curtiss Aeroplane Div., Buffalo; engine mount assemblies 110,975
Dixie Culvert & Metal Co., Atlanta; metal pipe 20,700
Economy Heating Co., Portland, Ore.; heating units 13,008
Equitable Equipment Co., Inc., New Orleans; steel barges 13,650
Fairchild Engine & Airplane Corp., Fairchild Aircraft Div., Hagerstown, Md.; aircraft parts 95,970
Fargo Motor Corp., Detroit; cars, 5 pasenger sedan 539,500
Ford Motor Co., Dearborn, Mich.; trucks, 1½-ton 1,417,673
George A. Fuller Co., Los Angeles; temporary buildings, Fresno Air Base 872,855
General Motors Corp., Chevrolet Div., Detroit; trucks, 1½-ton .. 158,920
ambulances, field 173,042
James B. Clow & Sons, Chicago; iron pipe 3,760
Graybar Elec. Co., Philadelphia; tools 13,210
Higgins Industries, Inc., New Orleans; landing boats 9,725
Idaho Hardware & Plumbing Co., Boise, Idaho; galvanized iron sheets 2,716
International Harvester Co., Chicago; trucks, 2½-ton 1,400,852
Omaha Steel Works, Omaha, Neb.; fabricated structural steel 536,610
Owens Yacht Co., Rescue (picket) boats 254,660
Packard Motor Car Co., Detroit; cars, medium sedan 7,199
W. W. Petley, Los Angeles; temporary buildings, Taft Field, Cal. 652,845
Seyler Mfg. Co., Pittsburgh; anchor rods 2,806
Studebaker Corp., South Bend, Ind.; trucks, 2½-ton 1,373,171
Underwood, Elliott Fisher Co., Washington; machine, accounting 1,100

Navy Dept., Bureau of Supplies and Accounts:

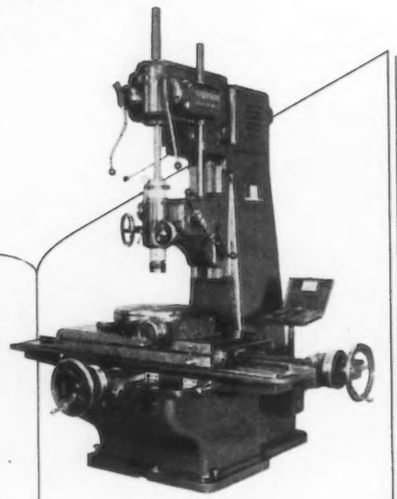
Aluminum Co. of America, Washington; aluminum alloy, ingot. $12,138
American Brass Co., Waterbury, Conn.; pipe and tubing, copper, seamless 66,879
American Chain & Cable Co., Inc., American Cable Div., Wilkes-Barre, Pa.; rope, wire, phosphor-bronze 61,064
Anaconda Wire & Cable Co., New York; cable 27,950
Dorsey C. Anderson, Philadelphia; machines, welding arc 14,130
Austin-Hastings Co., Inc., Cambridge, Mass.; machines, drilling and tapping, etc. 14,934
Baldt Anchor, Chain & Forge Co., Chester, Pa.; chains, anchor .. 48,137
Bay City Shovels, Inc., Bay City, Mich.; cranes 28,355
Bethlehem Steel Co., Bethlehem, Pa.; steel, class B-S 71,160

★ ★ ★ ★ ★ ★ ★

Critical Days...

"CRITICAL"

machines!



Cleereman Jig Borers are officially designated as "critical" machines—they are vital to America's Defense Program.

This is an old experience for *Cleereman* Jig Borers, because they already have successfully met all the exacting requirements of normal peace times.

Cleereman Machines will still be vitally essential to America's great metal working industry long after the strain of rearmament is past.

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Bryant Machinery & Engineering Company
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Sales Division of
Cleereman Machine Tool Company

CLEEREMAN

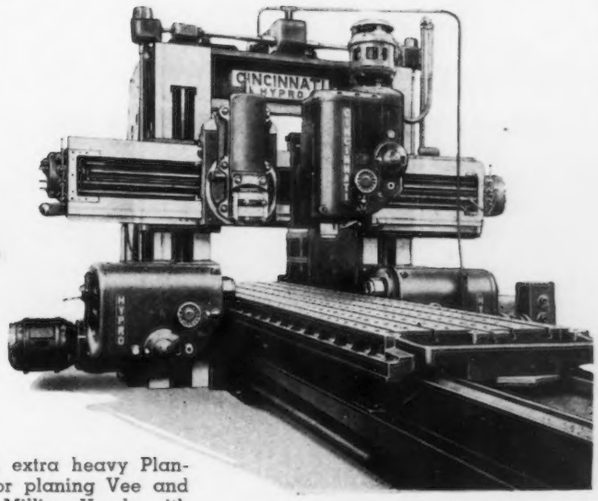
DRILLING MACHINES and JIG BORERS

THIS WORKMAN, in a factory in the west of England is constructing top fairings for the famed "Hurricanes."

Buffalo Fire Appliance Corp., Buffalo; engine, fire, pumping 7,579
Caterpillar Tractor Co., Peoria, Ill.; engines, diesel and attachments 11,086
Chapman Valve Mfg. Co., Indian Orchard, Mass.; valves, gate, steel 19,975
Chase Brass & Copper Co., Waterbury, Conn.; pipe and tubing, copper and brass 223,448
Crane Co., Washington; valves, angle, steel 190,552
Richard S. Danforth, Berkeley, Cal.; anchors, 100 lb. 21,350
Dravo Corp., Pittsburgh; bents, steel, staging, portable, complete 85,700
Elwell-Parker Electric Co., Cleveland; truck, industrial, electric. 6,900
Erie Forge Co., Erie, Pa.; forgings, steel 13,110
Ford Instrument Co., Long Island City, N. Y.; ordnance items ... 1,587,350
General Electric Co., Schenectady; cable 7,633
General Motors Corp., Chevrolet Div., Detroit; trucks, motor ... 56,057
G. A. Gray Co., Cincinnati; machine, milling, planer type motor driven 50,788
Graybar Electric Co., Inc., Washington; cable 60,790
Koppers Co., American Hammered Piston Ring Div., Baltimore; rings, piston 10,063
Leavitt Machine Co., Orange, Mass.; outfits, valve reseating 47,190
R. K. LeBlond Machine Tool Co., Cincinnati; lathes, medium duty 37,345
Lehman Machine Co., St. Louis, Mo.; lathes, 16-inch, motor-driven 31,081
Lidgerwood Mfg. Co., Elizabeth, N. J.; winches, diesel, engine driven 73,229
Liquidometer Corp., Long Island City, N. Y.; gauges, tank, distant reading 212,136
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; valves, steel 19,060
Monarch Machine Tool Co., Sidney, Ohio; lathes, precision 27,509
Morse Chain Co., Ithaca, N. Y.; chains and sprockets 9,197
Pacific Wire Rope Co., Los Angeles; rope, wire, steel 31,997
Phelps Dodge Copper Products Corp., New York; pipe, brass, seamless 154,139

Cincinnati

HYPRO
COMBINATION PLANING AND MILLING MACHINES



Planing and Milling with Same Machine on a High Production Basis

Multiple Tools in extra heavy Planing Head used for planing Vee and Flat and rugged Milling Heads with individual 20 H.P. motors, have reduced production time over 50% on grinder beds. This is only an example of time that can be saved with a machine of this type.
Machine illustrated is of entirely new design, incorporating individually driven 9½" Quill Milling Heads providing spindle speeds of 10 to 200 R.P.M. capable of handling cutters over 18" in diameter.

A wide range of planing speeds is provided to the table through separate planer motor and control. Machine can be instantly changed from milling to planing by movement of selector switch or control handle.
If you are interested in placing precision milling and planing on the same machine, the new Hypro Combination Machine merits your close attention.

Full Particulars Sent on Written Request.

Ask for our new bulletin No. 105.

PLANERS · PLANER MILLERS · BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

WANTED
SURPLUS NEW STEEL PRODUCTS

STRUCTURAL—BARS—(ALL GRADES)
PLATES
SHEETS (GALVANIZED—BLACK)
STRIP—TIN PLATE
WIRE PRODUCTS—PIPE

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ZINC SHEETS BRASS & COPPER SHEETS, TUBES & RODS

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Buying agents for a large
Responsible Export House

SAVE YOUR TOOLS
from an early death

Save the tools from abuse and you save on production costs. After you have done a good job in tooling your machine tools, finish the good work with a good coolant pump. It will save your tools from an early grave.

Many builders and users of machine tools prefer the Gusher Coolant Pump with its variable delivery from a trickle to a flood. They like the packless, non-priming, non-clogging features of the Gusher Pump.

The
RUTHMAN
Machinery Company
CINCINNATI, OHIO, U.S.A.

Mansfield, O., Still On Peace Products

Mansfield, Ohio

• • • **Output of this** diversified industrial center, where employment has reached a peak of close to 11,500, continues to be predominantly peace-time products. Yet Mansfield is interested keenly in the national defense program and feels it has the ability to make numerous useful articles for the preparedness drive.

The big Westinghouse Electric & Mfg. Co. plant, employing close to one-half of this city's workers, has been turning out ranges, roasters, refrigerators, washers and similar household equipment at a very high rate. Tappan Stove Co., Ohio Brass, and Empire Sheet & Tin Plate all are showing favorable business gains. Empire employs about 1100 persons and Ohio Brass about 600.

Some products of the above companies eventually end up in the defense picture. More directly assisting the national program are such plants as: Gorman-Rupp Co., which makes pumps; Barnes Mfg. Co., which is supplying fuel tank parts for submarines; Ideal Electric & Mfg. Co., making generators; Hoff Mfg. Co., soldiers' first aid kits; Richland Auto Parts Co., bomb release controls for airplanes; Taylor Metal Products Co., mobile kitchen equipment; Hughes-Keenan Co., metal bodies for trucks; Mansfield Tire & Rubber Co., rubber tires; Hartman Electrical Mfg. Co., electric switches; American Electrical Products Co., screw machine parts. Only two of these firms are working 100 per cent and the others are well below capacity. Practically all desire more government contracts or sub-contracts.

Also, in addition to all the above named companies, a recent survey by the Mansfield Chamber of Commerce showed 10 companies in the metal working field or closely allied to it which lack defense business. This group employs about 800 workers and offers 387,000 sq. ft. of floor space. One die shop listed 14 machine tools; one brass foundry listed about 15 machine tools; one stamping plant listed numerous brakes, squaring shears, presses,

440 Illinois Plants Lack Defense Work

Chicago

• • • Of 1100 plants surveyed so far in Illinois, about 40 per cent have no defense work, according to the state's department of labor. The survey embraces about 2500 plants, employing from six to 500. In the part returns, it was learned that firms without defense work were operating equipment less than three-fourths of one full shift. In addition, many firms found with defense work were discovered to be devoting most of their productive time to nonpreparedness output. The department offers its list for companies seeking sub-contractors in defense.

etc. An agricultural implement plant said that while it is now working at a seasonal peak, a large amount of idle machine hours are available. Empire Sheet & Tin Plate has an unoccupied mill-type building about 70 x 1200 ft. with cranes.

At the several plants still heavily engaged in making peacetime household equipment, the trend toward using substitutes for aluminum, nickel and zinc is becoming more pronounced.

Rubberized trays likely will replace the aluminum variety in refrigerators and where aluminum was used for decorative purposes it appears that porcelain enameled steel may take its place. It is understood also that for the cooker on certain electric ranges cast iron dutch ovens may be substituted.

Makers of household equipment have been using plastics liberally for ornamentation, handles, control knobs, door liners, etc., and will expand the use of plastics wherever possible. The size of the plastic mold has provided a limitation up to the present, however.

In certain other household equipment products copper is likely to be substituted for aluminum. All in all, plans for making substitutions are still pretty much in the air, particularly since new and unlooked for shortages in other metals are likely to arise.

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Write for data sheets giving compositions, physical properties, heat-treating guide and applications of our complete line. Keep them handy for reference and be prepared when you need steel in a hurry. Our seven convenient warehouses assure prompt deliveries.
Complete Stocks at
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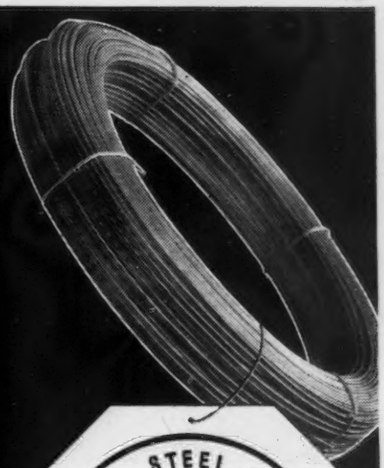
CONTINENTAL
SUPERIOR WIRE
FOR MANUFACTURERS
The Continental Superior label on manufacturers' wire is an assurance of quality and uniformity. It means that every step in the making of that wire from the charging of the open hearth furnaces to the final inspection of the wire has been under the supervision of metallurgists and trained men who are experts in this branch of steel making.
CONTINENTAL STEEL CORP., KOKOMO, INDIANA

CONTINENTAL STEEL CORPORATION
SUPERIOR WIRE
CONTINENTAL SUPERIOR STEEL
CONTINENTAL
STEEL CORPORATION
SHEETS: Galvanized, Black, Terne, Copperior, etc.
WIRE: Bright, Annealed, KONIK, Specials, etc.
Chain Link Fence, Nails, Roofing, etc.

27 Bills To Follow TNEC Conclusions

Washington

• • • **Recommendations made** to Congress by the TNEC, which include a proposal to abolish the basing point system, were understood this week to have prompted the drafting of at least 27 bills covering various phases of the TNEC proposals for subsequent introduction in Congress.

Few observers are willing to hazard a guess on the chances for passage of the ideas embodied in the newly-drafted measures but some saw reason for concern because of the possibility that the wartime and emergency atmosphere may permit the TNEC proposals to pass Congress without the same degree of attention ordinarily accorded such legislation.

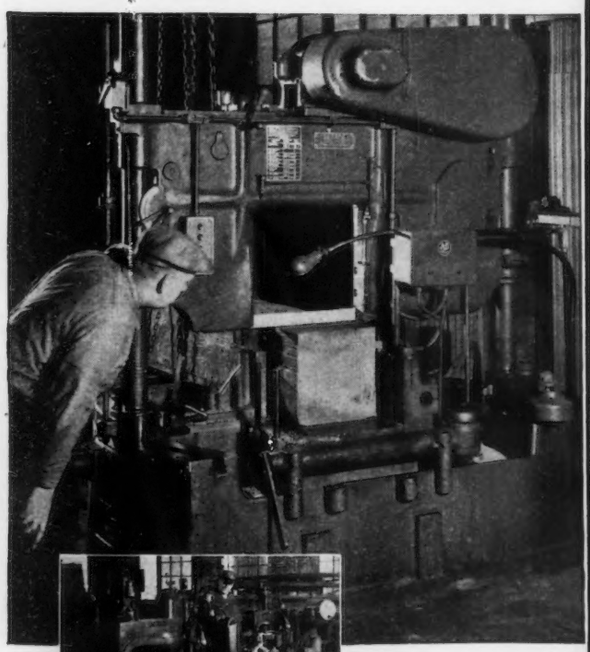
Bills similar to these have been introduced in Congress before and were either voted down or died in committee. The abolition of the basing point system, for example, was the subject of a bill introduced in Congress about five years ago by Senator Burton K. Wheeler, Democrat of Montana. The TNEC's advocacy of a Federal licensing law for corporations, brainchild of its chairman, Senator Joseph E. O'Mahoney, has made its appearance before in a modified version of the present O'Mahoney Bill.

So have many of the other suggestions now being whipped into legislative form; but this is perhaps the first time they will have come before Congress under circumstances so conducive to their success. Sponsors who are unable to seek justification for their measures in the interest of national defense can reasonably be expected to seek some strategic advantage in a situation which may permit non-defense legislation to pass virtually unnoticed.

In addition, legislative machinery today in the New Deal era is carried on under the sinister shadow of powerful government lobby. This fact, coupled with an atmosphere charged with the defense emergency, would make an ideal condition for the developmen of such legislation as the Federal licensing proposal. In this connection the New Deal is understood to be far more sympathetic toward the licensing plan than is generally known.

Observers who place this picture against a background of Congressional history and recall that much legislation now on the statute books originally was given no little chance of success, emphasize that the TNEC proposals cannot be treated lightly.

MARVEL SAWS



Photographed at Charles E. Larson & Sons, Inc., Chicago.

• A MARVEL No. 18 giant Hydraulic Hack Saw for the big jobs, and a pair of MARVEL 9A Automatics for exceptional speed, answer all the cutting-off problems of Charles E. Larson & Sons, Inc., Chicago.

It takes a lot of cutting-off to keep up with the rows of great hammers in this large modern, fully equipped forge plant, but it's for just such heavy-duty, high speed, continuous operation that these all-ball-bearing MARVEL SAWS were designed.

Whatever your metal sawing problems, there are MARVEL Saws exactly suited to your needs. The local MARVEL Sawing Engineer will call upon request, study your metal-cutting problems and make recommendations as to cutting-off methods, equipment and costs.

ARMSTRONG-BLUM MFG. COMPANY

"The Hack Saw People" **5700 Bloomingdale Ave., Chicago, U.S.A.**

Eastern Sales: 199 Lafayette St., New York, N. Y.

Woodward Earns $1.65 a Share

Birmingham

• • • **Woodward Iron Co.**'s net profit for the first quarter of 1941 was $551,897, equivalent to $1.65 per share on 334,000 shares of common stock outstanding, compared to net profit of $392,077, equivalent to $1.36 per share on 287,789 shares of common stock outstanding for the first quarter of 1940.

Iron Ore Shipments May Displace Grain

Cleveland

• • • **In order to** make certain that no shortage of iron ore is caused, it may be necessary before the end of the Great Lakes navigation season to leave some coal or grain for rail transportation, according to Ralph Budd, transportation commissioner of the National Defense Advisory Counsel, here April 3 to address the annual meeting of the Lake Carriers' Association.

Mr. Budd indicated that as near as possible Great Lakes vessel operators will be given a free rein.

"I have great respect for experience," he said. "Let the experienced Great Lakes men work out the problem of how they will handle the load.

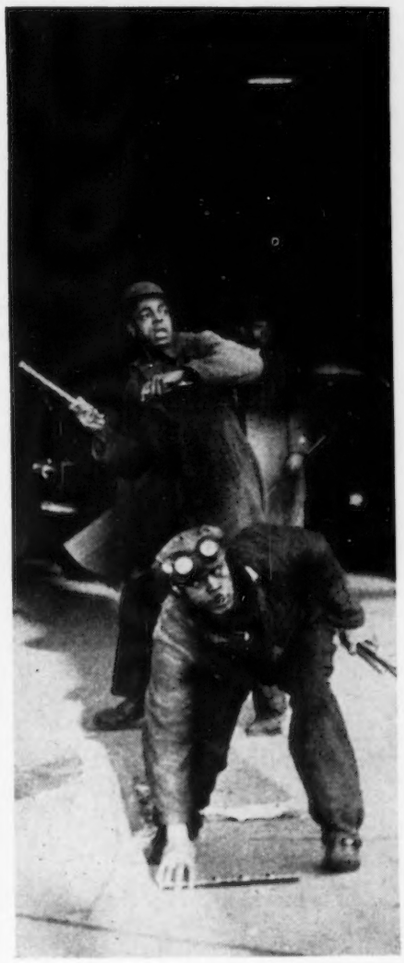
"Perhaps the capacity of the Great Lakes carriers is ample to take care of all movements of every kind, as we know they are in normal times.

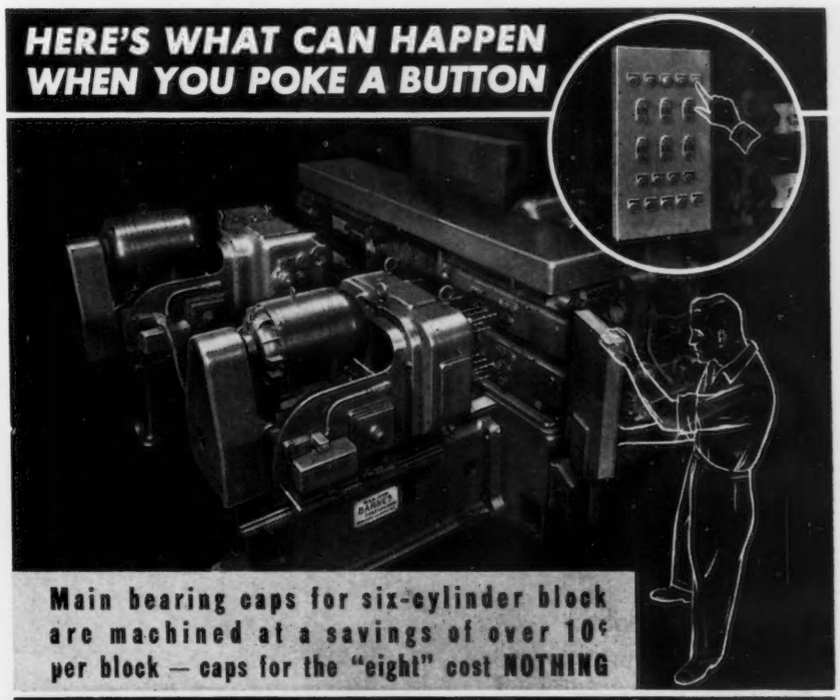
"Our hope is that the railroads and other forms of transportation will continue to have available ample transportation of good quality so that any traveler or shipper may choose the route and service he wants and get it."

At the annual business session of the Lake Carriers' Association H. C. Strom, vice-president, Pittsburgh Steamship Co., was elected to the executive committee. D. C. Potts, traffic manager for the Pittsburgh company, was elected as a director. Officers were re-elected, including A. T. Wood, president.

TWO NON-STRIKERS, armed with iron pipes, prepare to battle CIO pickets at the Ford Motor Co.'s River Rouge plant during a strike which tied up $155 millions of defense orders.

Photo by International




HERE'S WHAT CAN HAPPEN WHEN YOU POKE A BUTTON
Main bearing caps for six-cylinder block are machined at a savings of over 10¢ per block — caps for the "eight" cost NOTHING

WHEN YOU CAN'T HIRE SKILL, HAVE BRAINS BUILT INTO YOUR MACHINES

MACHINE IN BRIEF — Main bearing caps, for both a six and eight-cylinder engine, enter this machine in solid iron. They leave drilled, reamed, tapped, notched for retaining bearing liners, and sawed apart. The fixture is double decked to accommodate the caps for the eight and six-cylinder engine. Production is 87 of each size per hour.

The machine cycle is automatic. The operator need only load the caps. Unloading is entirely automatic.

In times of shortage of skilled labor you can use this type of design service to advantage. Perhaps an analysis of your part and production methods will reaveal the need for a simple machine, easy to operate. It may lead to a more intricate machine—but equally simple to operate. It may make that contemplated purchase of a battery of standard machine tools, needing a squad of experienced operators, look like a foolish investment.

An example of the results of our work with an automobile manufacturer is described to the left. We've had a lot of experience in designing and putting our standard units together in various forms of special machine tools and would welcome the chance to work with you on your machining problems.

Our booklet "Since 1872 . . . " illustrates how it has worked for others . . . send for your copy.

W. F. AND JOHN BARNES

ROCKFORD • • • • • ILLINOIS

DESIGNERS AND BUILDERS OF DRILLING, BORING, TAPPING, MILLING, AND HONING MACHINES TO SUIT YOUR PARTS — YOUR PRODUCTION.

Sheet & Tube, Republic Set Output Records

Youngstown

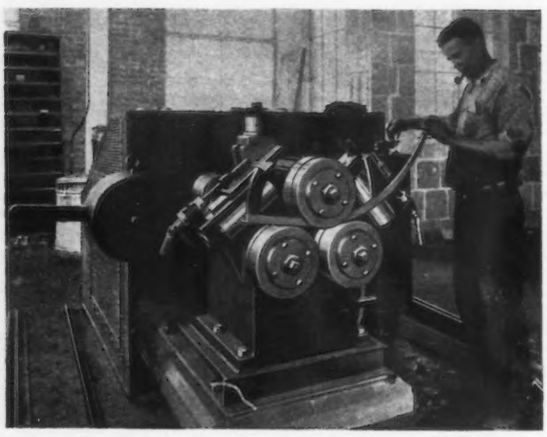
• • • **Production of open hearth** ingots by Youngstown Sheet & Tube Tube Co. during March shattered all records. The company operated at 107.7 per cent of rated open hearth capacity. Total ingot production was 336,116 net tons, against 322,311 tons in the best previous month.

The Brier Hill open hearth department showed the largest gain, producing 100,905 net tons, against 95,548 tons previously. Indiana Harbor turned out 84,785 net tons, against 83,324 tons previously. The Campbell works produced 102,045 net tons against 99,073. previously. Numerous rolling mill records were broken during March by Sheet & Tube.

Every single steel-producing department of Republic Steel Corp. established new production records during March. Output of raw steel totaled 721,243 net tons for the corporation, larger than any month since Republic was organized. During March, Republic shipped 540,000 tons of finished steel, another all-time record. Payrolls at $10,500,000 during March also were at a new high.

Otis Steel Co. established four new all-time records in the month of March, according to J. W. Montgomery, vice-president and general manager. The company produced 96,311 tons of steel during the month, an increase of 5600 tons over the previous record set in January, 1941. All-time records also were established by the blooming mill, the plate mill and the 77-in. hot strip mill at Otis.

SOLVED! THE BENDING PROBLEM....



Even unskilled labor can "go to town" on your bending operations with a ***Buffalo*** Bending Roll! These up-to-the-minute machines are husky, fast and accurate—turning out arcs, circles, spirals and other circular forms with practically *any* type of stock. Here's a sure way to step up production—and save money in the bargain. Write today for full details on Buffalo Bending Rolls. Ask for Bulletin 352-A.

BUFFALO FORGE COMPANY

492 Broadway, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" **Bending Rolls**

Metal Mining Work Day Ruling In Effect May 1

• • • **The effective** date of the ruling under the wage-hour law defining the work day in the metal mining industry has been postponed to May 1. The new date was fixed following a hearing with industry representatives.

Wage-Hour Administrator Fleming had ruled that the work day starts "when the miner reports for duty as required at or near the collar of the mine, and ends when he reaches the collar at the end of the shift," and directed that it be made effective April 1. Several industry representatives then urged that this date be postponed.

Companies asking for the delay included Woodward Iron Co., Sloss-Sheffield Steel & Iron Co., Republic Steel Corp., and the Tennessee Coal, Iron & Railroad Co. Colorado Fuel & Mining Co. requested the administrator to rescind the ruling.

H. B. Smith Lifts Wages 5%

• • • **The 250 employees of** the H. B. Smith Co., Inc., Westfield, Mass., manufacturers of boilers and heating systems, were granted a general 5 per cent increase in pay April 1.

West Coast Gets 16 2/3% Of Defense Contracts

• • • **The regional pattern** of national income was not significantly altered in 1940 by the defense program, but concentration of defense contracts in certain areas may be a major factor in changing the state distribution of national income in 1941, according to the Division of Industrial Economics of the Conference Board.

The most pronounced prospective shift is a sharp increase in the Pacific Coast states. Within a period of nine months, California, Oregon and Washington have received almost one-sixth of all national defense contracts awarded, whereas in 1939 the three states together accounted for only 6.5 per cent of the national value added by manufacture and in 1940 accounted for only 7.4 per cent of the population and 9.4 per cent of the national income. As compared with a total of $1.6 billion of value added by manufacture in 1939, the Pacific Coast states have already received almost $2 billion in defense contracts.

Indiana Powder Plant To Operate By April 15

Charlestown, Ind.

• • • **An estimate that first** production line of the smokeless powder plant under construction here will be operating by April 15 has been made by plant officials. This would be about a month in advance of original expectations. The line would produce 100,000 lb. daily of the 600,000 per day production to be achieved when the entire plant is in operation. E. I. duPont de Nemours will operate the plant which will ship its explosives to the nearby Hoosier ordnance work, to the Burns City, Ind., naval ammunition dump, and to the shell loading plant in Kingsbury, Ind.

Hobart Mfg. Sets Record

• • • **Defense and private** business orders accounted for a March output that was the greatest in the history of the Hobart Mfg. Co., said E. R. Greely, sales manager. Plants in Dayton and Troy are working on a 24-hour basis.

Coal Price Freezing To End After Strike

Washington

• • • **NDAC Price Commissioner** Leon Henderson has ruled that the April 2 order freezing coal prices does not prohibit coal producers from quoting higher prices on coal to be mined after resumption of mining operations. Mr. Henderson's opinion was prompted by an industry query asking whether quotations on deliveries to be made after the strike ends may provide for increases to cover increased wage costs.

The head of the NDAC price stabilization division promised that the coal price fixing order "will be revoked as soon as practicable after substantial resumption of production."

PRECISION EQUIPMENT FOR PRECISION WORK

CHALLENGE SEMI-STEEL LAPPING PLATE

For accurate lapping of joints required to hold oil, this Challenge Lapping Plate is highly recommended. It is specifically designed to assure a perfect fit when lapping metal-to-metal joints on which no sealer of any kind is used. Made of finest semi-steel, specially heat-treated and machined, this plate has grooves, running the full length and width of the surface. Available with or without an all-steel, arc-welded stand, equipped with lock leveling screws to keep the plate absolutely level. Ask for sizes and prices. There's no obligation.

CHALLENGE SEMI-STEEL SURFACE PLATE

HAND SCRAPED

Heavy, deep ribs on the under side form triangular supports for the top surface. Felt-lined wooden cover furnished with each plate.

Here is a true surface for tool making, inspection, and testing purposes. Built to retain an accurate plane surface. Made of strong, close-grained semi-steel, specially treated to overcome strains in casting and machining and to avoid distortion after scraping. Nine sizes.

THE CHALLENGE MACHINERY COMPANY

GRAND HAVEN, MICH. Challenge 389

FREE CATALOG—Illustrates and describes Challenge Time- and Labor-Saving Devices for Tool and Machine Industries.

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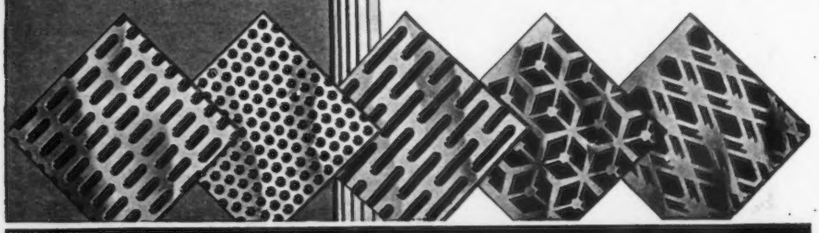
INDUSTRIAL and ORNAMENTAL

H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

Send us your specifications.

ANY METAL - ANY PERFORATION



The Harrington & King Perforating Co.

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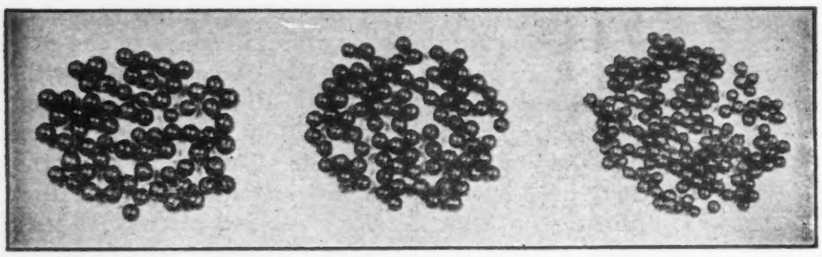


HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

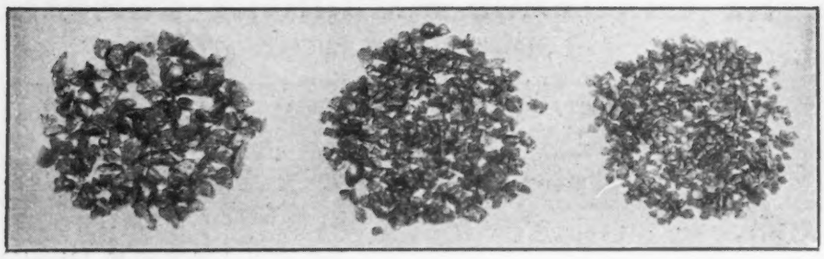
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



Dominion Steel Plant To Add Open Hearth

Ottawa

• • • **C. D. Howe, Minister** of Munitions and Supply, announces formation of a new government-owned company, Wartime Merchant Shipping, Ltd., whose duties will be centered on production of merchant vessels for the Canadian and British governments. H. R. McMillian of Vancouver, B. C., will head the new company, which will have nothing to do with the building of war vessels.

Further expansion of Canada's primary steel industry is indicated by announcements made by Mr. Howe. The enlargements will be financed by the Canadian government. He stated that plans are being considered for installation of an additional open hearth furnace at the Sydney, N. S., works of Dominion Steel & Coal Corp.

Government sources report that Glenn Martin type bombers will be turned out in Canada on an extensive scale, and negotiations now are under way with this object in view. It is further stated that in order for 200 of these bombers, costing upwards of $100,000 each, has been placed with National Steel Car Co., Malton, Ont. Company officials, however, have not confirmed the order, but it is stated that first reports must come from the Minister of Munitions and Supply.

NEWEST WEAPON of the artillery arm of the U. S. Army is this 8-in. howitzer (Wt. 32,500 lb. Range 18,600 yd. with a 200-lb. projectile). Disclosing a re-

Canadian Prices Fixed On Foundry Scrap

Toronto

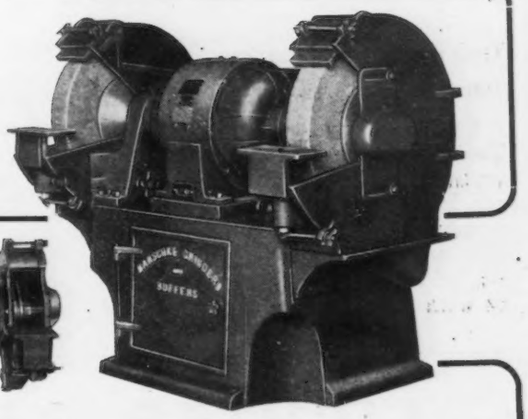
• • • **Canadian Institute** of Secondary Materials has been formed by some of the leading scrap dealers in this country, the purpose of which is to provide an even flow of iron and steel scrap to foundries and mills, to eliminate profiteering in scrap, and to hold prices on an even level.

The organization's policy has the support and approval of the Canadian Steel Controller. The first move, originating at Ottawa, calls for stability in consumers' iron scrap prices, with the following maximum f.o.b. delivery points: No. 1 machinery cast, $23.50 gross ton; No. 2 cast scrap, $21.50 gross ton and stove plate $19.50 gross ton. Under this policy freight differentials are discarded and prices are fixed for consuming points. This would indicate that consumers will have to depend largely on dealers in their immediate areas for supplies rather than drawing on supplies that involve long and costly freight hauls.

Following the fixing of maximum prices for consumers on iron scrap, dealers introduced new buying prices, effective April 7, as follows: No. 1 machinery cast, $20; No. 2 cast, $18, and stove plate $16 per gross ton delivered yards.

markable accuracy at full range, the gun was put into firing position in 4 min., had three projectiles in the air at one time at Fort Bragg, N. C. *Photo by Wide World*

MARSCHKE "Constant Cutting Speed" D.C. Grinder gets the last penny's worth out of wheels. Adjust work rest to wheel wear and wheel speeds are automatically and correctly advanced.



MARSCHKE Wide-Type Pedestal Grinder, 7½ HP. Guard opening may be set anywhere around wheel. Indispensable for grinding bulky and irregular shapes.

GRINDING WHEEL ECONOMY

Maximum wheel economy through maintained s.f.p.m. . . . operating conveniences possessed by no other machines . . . reliable performance . . . these are among *eighteen* definite reasons why we say that *only Marschkes give what you want in heavy duty grinders.* Bench, Pedestal, Stand and Swing Frame types, from 1 to 25 HP. *Write today* for complete Catalog, to

VONNEGUT MOULDER CORPORATION
1843 Madison Ave., Indianapolis, Ind.

Extra grinding wheel economy.
Extra operating conveniences.
Extra safety.

★ THE MARSCHKE LINE ★

STEP ON IT... *in more ways than one*

THIS spring return valve allows fast operation of air powered equipment; merely release the foot pedal for instant reversal of the cylinder. Foot pedal control leaves the operator's hands free; control is simple and convenient, especially adapted to arbor presses, riveters, etc.

Hannifin disc-type design has no packing, and no leakage or packing maintenance troubles. Made in 3-way and 4-way types, hand and foot operated, for control of all types of air operated equipment. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue • Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • DOUBLE-ACTING PNEUMATIC AND HYDRAULIC CYLINDERS, ALL SIZES

HANNIFIN *"Packless"* AIR CONTROL VALVES

Tool Engineers Charter Two More Chapters

• • • **The American Society** of Tool Engineers has chartered its fortieth and forty-first chapters, continuing its rapid expansion of membership in defense industries. The fortieth chapter is Springfield, Vt., and was chartered on March 14 with 70 charter members.

Officers elected are: Chairman, Wilbur Handey, chief tool designer, Fellows Gear Shaper Co.; vice-chairman, Merton Arms, chief engineer, Bryant Chucking Grinder Co.; secretary, Milan Jennings, tool engineer, Jones & Lamson Machine Co., and treasurer, James H. Beardsley, ass't tool supervisor, Jones & Lamson.

New Haven, Connecticut, is the headquarters for the forty-first chapter, chartered on March 18 with 30 charter members. The following officers were elected at the meeting: Chairman, Henry J. Bellemore, chief inspector, High Standard Mfg. Co.; vice-chairman, Harry Chellis, Harry E. Chellis Co.; secretary, A. H. Hitchcock, tool designer, Gilbert & Barker Mfg. Co., and treasurer, Andrew P. Schoeffler, superintendent of manufacturing, Sargent & Co.

Plans for the chartering of a second Canadian chapter has been announced by the board of directors. The chapter will be at Hamilton, Ontario.

Indicative of the growth of the technical society during the past year, it was revealed this week that membership since January 1940 had increased 73 per cent. The membership roster will pass the 7000 mark before the middle of April.

LIGHTER GAUGE STAMPINGS, too

The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer—16¾" long, 18⅛" wide and 5¼" deep—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear—and true to gauge.

Present your problems to Parish. The services of our engineers frequently result in economies of important proportions . . . yet their contributions are not evident in our costs.

Let us review your requirements.

PARISH PRESSED STEEL CO.
READING, PA.
PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

New Sectional Top For Gondola Cars

Pittsburgh

• • • **A new sectional top** has been devised for gondola cars, protecting the contents of the car from weather and tampering. The sectional top, light in weight and easily installed and disassembled, was developed by J. M. Hilbish and J. H. McCahan, Pittsburgh. Fabricated from 20 gage sheet steel and reinforced with 3/16 x 1-inch flats and 1 x 1 x 3/16 in. angles, the section weighs about 70 lb. and is either 24 or 34 in. wide, with length adjusters to fit varying car widths. The entire top for a 46-ft. car weighs about 1200 lb., and is normally formed of 16 sections that interlock with each other by means of a standing seam, interlined with sponge rubber, forming a waterproof seal. Joints between the ends of the sections and the car sides are interlined with waterproof paper to prevent seepage.

New Ship Firm Organized

• • • **South Portland Shipbuilding** Co., Inc., South Portland, Me., has filed corporation papers. Its yard will be close to that of the Todd-Bath Iron Shipyard now under construction. The new company's initial order is 15 cargo vessels for the government.

Photo by Wide World

THIS IS HAROLD CHRISTOFFEL: Clutching a telegram in which the OPM has ordered reopening of the Allis-Chalmers plant at West Allis, Wis., Harold Christoffel, president of the CIO union at the plant, tells strikers not to go back to work until the union sanctions the reopening. Christoffel is a key figure in the strike which has shut off needed equipment from most of the large defense industries. On April 6 the National Defense Mediation Board had negotiated an agreement to end the strike.

Subcontracting Officials Appointed At Chicago

Chicago

• • • **Coordinating officials** to push subcontracting in defense work have been appointed by the Federal Reserve Bank of Chicago for the seventh district. They are: W. Homer Hartz, president of Morden Frog & Crossing works; Thomas S. McEwan, consulting management engineer; and A. L. Olson, assistant vice president of the district's Federal Reserve Bank.

Midvale Has 200,000 Shares

• • • **Midvale Co.** has 200,000 shares of common stock outstanding, instead of 2,000,000 shares as incorrectly reported in the Financial Analysis of the Steel Industry—1940, published in the April 3 issue of THE IRON AGE.

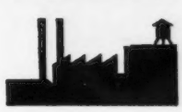
Charts For Learners Offered

• • • **Trade schools and** companies with apprentice training programs are being aided by a series of blueprint charts on lathe practice released recently by Atlas Press Co., Kalamazoo, Mich. The three charts now available are: Lathe Cutting Tools, Thread Forms and Formulas, and 60-deg. V-Type Thread Dimensions. The three Atlas lathe charts are being offered for a limited time to industrial instructors and apprentice directors. A charge of 10c. in stamps is made to cover handling and mailing expense. The set will be sent free postpaid with each order for the Atlas Manual of Lathe Operation, a 272-page instruction book covering every phase of modern lathe work ($1 per copy in U. S.).

Its unique chemical resistance makes Causplit Cement a success where other cements fail. For Causplit readily handles a wide range of strong acids, alkalies and solvents at temperatures up to 350°F.

And Causplit is quick-setting, tough and durable, easy to apply, resistant to abrasion and to rapid changes in temperature. Proved admirable for corrosion-proof equipment lining in extensive industrial tests, Causplit Cement represents a considerable improvement over Penchlor Acid-Proof Cement and Asplit Cement, which have been successfully used in many industries for over 7 years.

CHEMICAL PLANTS profit by using Causplit because it resists hydrochloric, phosphoric and other strong acids, carbonates, sulfates and other salts, ammonia and various strong alkalies, phenol, toluol, alcohols, acetone and numerous other chemicals. Causplit Cement can be used in equipment handling alkalies and acids alternately—where other cements "wash out."



PAPER AND PULP MILLS find Causplit economical and durable for pulp digesters, bleaching system equipment, acid towers, recovery systems, etc. It withstands abrasion, repeated washings, sudden temperature changes, and chemicals used in the industry—including 50% caustic soda, soda ash, hypochlorites and chlorine, sulfurous acid, sodium sulfite, sodium sulfide, alum and others.

STEEL MILLS can use Causplit Cement for pickling, neutralizing and degreasing tanks and similar equipment because it is unaffected by sulfuric, hydrofluoric and hydrochloric acids, by strong alkalies, salts and solvents. Causplit maintains tight joints and preserves bricks, far outlasting other types of cement construction.

Wire or write today for FREE TEST KIT, including samples, booklet of information and test data showing Causplit's resistance to various acids, alkalies and solvents. Pennsylvania Salt Manufacturing Co., Widener Bldg., Philadelphia, Pa.—New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma.

PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals

Can Makers Invited To Meeting on Tin

Washington

• • • **The OPM has** announced a three-point program to conserve essential defense materials through voluntary cooperation by manufacturers, merchandisers and the public. Looking to conservation of tin, manufacturers of cans have been invited by Robert E. McConnell, chief of the OPM Conservation Unit, to a meeting here on April 16. At a meeting of merchandisers on the following day they will explore the possibility of reducing civilian consumption of articles made from critical and strategic materials in which shortages might develop. Possibilities of conservation will be explored with respect to such materials as aluminum, nickel, neoprene, tungsten, zinc, chromite, graphite, manganese, quartz, crystals, rubber, bauxite and copper.

LE TOURNEAU ANGLEDOZER and D8 Caterpillar tractor handling ore at a dock on Lake Erie as the OPM acts to lengthen the iron ore shipping season on the Great Lakes to aid defense.

The three-point program calls for conferences with committees representing manufacturers and processors to discuss possible substitutions and other savings to be made voluntarily in the event of material shortages; conferences with representatives of merchandisers to explore the possibility of featuring goods made from plentiful materials and appeals to consumers to use substitutes in cases where shortages exist or are imminent.

Fitting in with this program the Conservation Unit has suggested to the National Association of Waste Materials Dealers, Inc., that each branch of the industry it represents form small defense committees to meet from time to time with the Conservation Unit to propose means of maintaining adequate supplies of metals and materials in which shortages might develop.

Fuller Succeeds Harriman

Washington

• • • **Samuel Richard Fuller, Jr.,** who was in charge of Navy steel and machine tool procurement during the World War, has been named chief of the materials branch in OPM's division of production. Mr. Fuller succeeds W. A. Harriman, who was sent to London by the President. Mr. Fuller will retain his duties as chairman of OPM's Production Planning Board.

How To Fight Welding Fires

• • • **The International Acetylene** Association is making available to all engaged in welding and cutting work copies of its booklet "Preventing Welding and Cutting Fires." Copies of the 16-page booklet can be obtained by writing to the Secretary, International Acetylene Association, 30 East 42nd Street, New York.

"HERCULES" RED-STRAND WIRE ROPE
REG. U.S. PAT. OFF.

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

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A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
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PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

National Lifts Pay Rate 10c.; U.S. Steel Walkout Is Averted

BY T. C. CAMPBELL

Pittsburgh

• • • **National Steel Corp.** this week announced a wage increase of 10c. an hour, effective April 1, while Carnegie-Illinois Steel Corp. and SWOC officials were holding what were expected to be the final negotiations on the eve of a threatened strike of U. S. Steel Corp. plants.

Ernest T. Weir, National Steel's chairman, made the wage increase announcement, expected to be followed by other major steel companies, with a 47-word statement which said "detailed arrangements are now being worked out in all subsidiaries."

Refusal of U. S. Steel to grant the checkoff of dues—in which an employer takes monthly dues from pay envelopes to finance the union—was understood to be the chief obstacle in its negotiations with the SWOC and on April 6 Philip Murray, chairman, and David J. McDonald, treasurer, of the SWOC, sent to local unions a strike announcement which said, in part:

"This notice is to advise you that there will be a cessation of work at the mills and plants of the subsidiary companies of the U. S. Steel Corp. on midnight April 8, 1941, caused by the lockout.

The threatened strike was averted early this week when Carnegie-Illinois Steel Corp. accepted the SWOC offer of an extension in the April 8 deadline to April 15. The latest resolution agreed upon by Carnegie-Illinois and the SWOC is identical to the one made more than a week ago when the April 1 deadline was extended and carries a retroactive clause to April 1 on all matters contained in a final agreement.

Mr. Weir's sudden move marks the third time National Steel (which has no SWOC contract) has led the parade in announcing new high steel wage rates. In 1934 National Steel hiked wages a day or so before an industry raise was announced through the NRA steel code authorities. Again in early 1937, while U. S. Steel officials were in conference with the SWOC drawing up the now historical wage contract, Mr. Weir announced a $5 day minimum for steel workers, which was officially announced a short time later by Carnegie-Illinois Steel Corp.

It is believed National Steel's action in raising wages 10c. an hour will have a far reaching effect on the steel industry economy since informed sources insist the government will not countenance a change in steel prices from their present level. Some independent steel executives have been outspoken in private conversations to the effect that a 10c. an hour advance is too much for some of the smaller companies to absorb without a compensating price increase. It is claimed that many of the small non-integrated steel makers will now be in a "double squeeze" play owing to some raw material costs having advanced and the fact that the companies will almost be forced into meeting the new wage rates.

By granting a 10c. wage increase, the maximum amount demanded by the SWOC from U. S. Steel Corp., Mr. Weir has taken the play away from Philip Murray, CIO and SWOC head, unless the latter is able to wring from Carnegie-Illinois additional concessions, such as closed shop, check-off of union dues, and union seniority rights. Mr. Murray, it is believed, will be forced to obtain some concessions other than a wage increase in view of the long negotiations attended by him and his lieutenants with U. S. Steel officials—meetings both formal and informal which are said to have begun last November.

The U. S. Steel Corp., it is reliably reported, had expected to go as high as 7½c. to 8c. an hour, provided other contract stipulations were agreeable to them.

When this action is finally taken, it will meet head-on with

Communist Cells In SWOC at Chicago, Union Leader Says

Gary, Ind.

• • • Communists have "wormed their way" into SWOC ranks in steel mills here, Joe Germano, district director, and Frank Grider, subdirector have admitted. Germano said, "During four years of work in organizing in the Calumet and Gary steel mills, I have fought Communists relentlessly. But despite my efforts I must admit that cells of reds have crept into the organization." Grider, too, commented, "These Communists joined the SWOC under assumed names. We can't help it if they are plotting to cripple national defense, but we'll do everything possible to halt their efforts."

THE LITTLE MAN WHO WANTS TO WORK: Knocked into the gutter during a fight between strikers and non-strikers at the Ford plant at Dearborn, Mich., this workman waits for the battle scene to shift. *Photo by International*

the price situation on which Washington authorities have had much to say. Informed Washington sources insist that no increase in steel prices from the present level will be countenanced and the New Deal opinion there is that the 10c. an hour increase could be called "moderate."

Unless the steel industry finds some way to advance its prices to an amount sufficient to absorb that portion of the wage increase which is expected to come and which cannot be taken care of in total by operating economies, steel earnings will undoubtedly be substantially affected this year. There is also a danger that many of the smaller companies will find the hurdles too great if they must go along with the wage increase without compensating price adjustments. These smaller concerns may be forced to charge premiums or post a price quotation higher than the general price level in case the latter should not be adjusted upward.

Speculation is expected to continue between now and April 15, the new deadline on the SWOC—Carnegie-Illinois negotiations. Although wage rates have figured prominently in newspaper stories, the fundamental issue at stake in the present negotiations between the union and the U. S. Steel Corp. involve the open shop policy of the latter.

U. S. Steel has repeatedly enunciated an open shop policy and has steadfastly refused, in its steel mills, to countenance anything similar to a closed shop or a union checkoff in dues. If there is a complete deadlock followed by a work stoppage or strike in any of the corporation's mills, the chief stumbling blocks will undoubtedly have been a fight over the question of union shop, or checkoff. Philip Murray, it is said, faces as much of a dilemma as the U. S. Steel Corp. since the holding of a "Big Steel" contract has long been the SWOC's greatest asset. In other words, the corporation holds too much defense work to hazard a strike and Murray has too much at stake for the future of SWOC in being responsible for calling an extended strike. These questions will soon be answered, as will be the inquiry on how some steel companies can raise wages 10c. an hour without a corresponding price increase.

New Steel Wage 72½c. Against 20c. In 1914

• • • Wages paid steel plant labor when National Steel Corp.'s 10c. an hour increase is followed by other large steel companies will be 72½c. an hour, compared with 62½c. before the increase.

In 1914, at the outbreak of the first World War, the common labor rate in the steel industry was 20c. This advanced to 47c. an hour on Oct. 1, 1918, shortly before the war's end.

(For complete record of all steel wage rate changes since 1914, see IRON AGE, *Jan. 2, 1941 issue, page 58.)*

NLRB Orders Vote At Ford and Bethlehem

Washington

• • • The National Labor Relations Board on Monday called collective bargaining elections at the Bethlehem Steel Co.'s Lackawanna, N. Y., plant and at the River Rouge and Lincoln plants of the Ford Motor Co. at Dearborn and Detroit, respectively. At the same time the board authorized hearings on representation disputes at five plants of the International Harvester Co.

At the Bethlehem election, to be conducted when necessary arrangements have been made, production and maintenance employees will vote for or against the SWOC's local union 1024. The CIO union on March 5 asked the NLRB for a certification of representatives. Three elections will be held within 45 days at the two Ford plants, the representation issue being the AFL and CIO unions in the industry.

The International Harvester election was called to permit both employees and employers to know who is authorized to represent employees.

↓ ↓

Pittsburgh

• • • Production employees of the Union Switch & Signal Co. here were to have voted this week at a National Labor Relations Board election, at which time they were to have been given the choice of a CIO union, an employees' association, or neither.

Steel Price Rise Considered Certain

Cleveland

• • • On Tuesday morning following Mr. Weir's wage announcement, leading steel producers here were inclined to await the outcome of the U. S. Steel Corp. negotiations before making a move. This tendency toward caution arose from indecision over whether a price increase would be permitted.

Most steel consumers, however, quickly made up their minds that there would be a price increase, inevitably. The trade for some time has held the opinion that a 50c. an hour increase in pay would be on the borderline between absorption and higher prices, while 7½c. per hour or higher would clearly call for a price boost. While it is not well known, the amount of pay increases given by steel consumers to their own employees recently is considerable.

In some quarters Mr. Weir's action is greeted as being valuable for providing a clear-cut issue and forcing the whole pay-and-price question to the point where the necessity of a price increase is no longer in doubt.

It is also pointed out here that unless a corresponding price increase were allowed, the government's cut on taxes would be seriously lowered. The amount of a 10-c. per hour wage increase applied to the whole steel industry is tremendous.

Lukens Steel Machine Shop Employees Strike

• • • Machine shop employees of the Lukens Steel Co., Coatesville, Pa., were called out on strike Monday by the SWOC. The union demands a pay raise of 30c. an hour, dues checkoff and abolition of the present bonus system.

Strike Planned at Alan Wood Iron Mine

• • • Leaders of the Dover Miners Union 525, a CIO affiliate, early this week announced the union had voted in favor of a strike at the Alan Wood Steel Co.'s Scrub Oak iron mine, near Dover, N. J. The union is seeking a wage increase of 10c. an hour.

U.S. Mediation Board Ends Costly Strike At Allis-Chalmers

Milwaukee

• • • **The famed "referee** clause" —the embattled point on which hinged the Allis-Chalmers strike— was settled by the Defense Mediation Board in Washington, and thereby settled the strike.

The Mediation Board agreement provides for company and union to select an impartial referee from a list submitted by the DMB; lacking agreement, the board will choose the referee. Both union and company had long argued over previous referee clause, the union claiming the original ambiguous phrasing offered "union security" and company contending that ambiguity left the question of closed shop entirely up to the individual referee.

Other points in the settlement agreed upon in Washington by company and union:

No employee is permitted to engage in union activity on company premises, except as provided in agreements with labor organizations certified as exclusive bargaining agencies.

Company will maintain shop discipline and enforce rules to that end. Union may appeal disciplinary action against employee and referee will decide what action should be taken, unless referee finds that employee did not interfere with shop discipline; that his act did not interfere; that company's disciplinary action was discrimination against the union.

Fact that employee is not a union member or not a member in good standing is not in itself cause for disciplinary action.

All employees on payrolls on Jan. 22, 1941, restored to jobs without discrimination.

With provision for final arbitration of all disputes, it is mutually agreed that there shall be no strike or lockout or interruption of production during term of agreement.

In selecting a referee, DMB will submit a list of names within five days; if the company and union cannot agree on a referee within an additional five days, then selection will be made by the Defense Mediation Board. It is mutually understood and agreed that the decision of the referee shall be final and binding on both parties.

Company's rules and regulations for shop discipline will be incorporated in the contract; thereafter company will make no rule or regulation inconsistent with the agreement and no rule or regulation of discriminatory character.

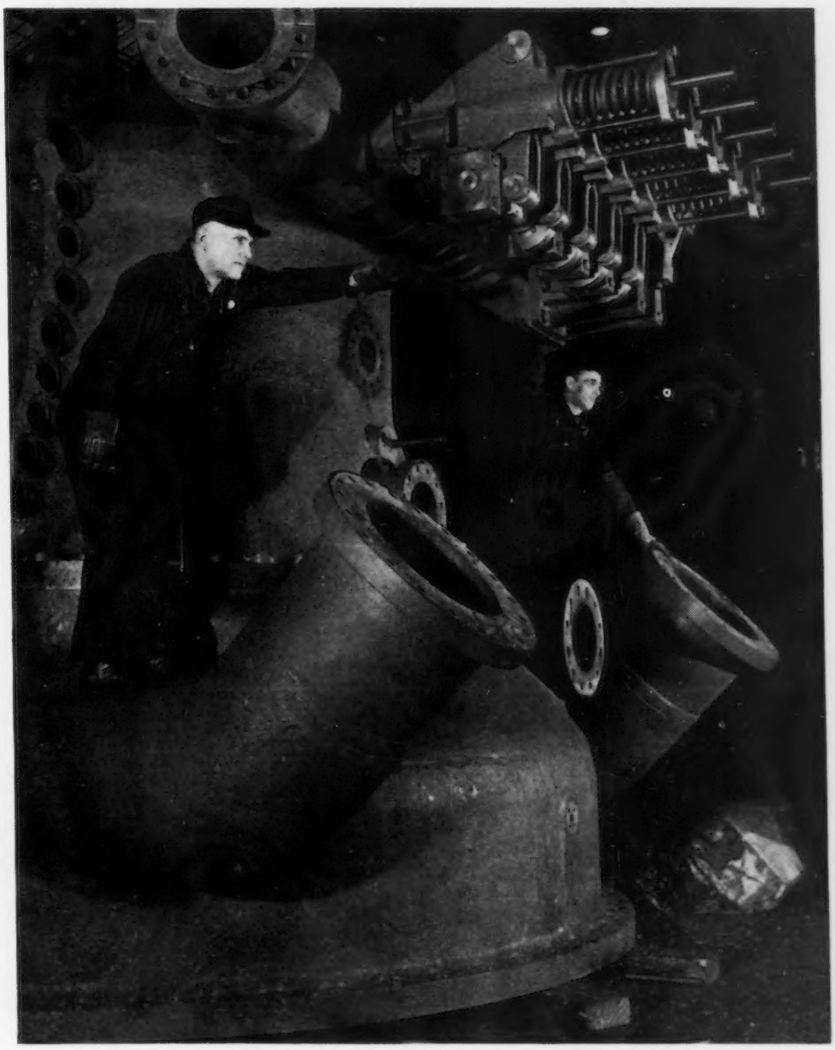
Within two days after signing of agreement and resumption of production, negotiations for blanket wage increases will be launched; any increase granted shall be retroactive to take effect on the day of resumption of production.

The agreement shall remain in force for one year and thereafter from year to year, unless one party gives notice in writing at least 30 days prior to expiration of the agreement. If new agreement cannot be reached within 30 days, then existing agreement will be automatically extended for additional 30 days during which time negotiations will be conducted before the United States conciliation service.

How Communists Stand On Allis-Chalmers Strike

• • • **"Labor is on the** march against the economic royalists. The struggle of Allis-Chalmers workers against industrial autoc-

THIS IS THE UPPER half of an 80,000 kw. turbine shell being built by General Electric Co. for the Duke Power Co. in Rowan county, North Carolina.



1941 Strikes Differ From Last Year's In Greater Danger To Defense

• • • Organized labor in the U. S., particularly the CIO, has grown more "bottleneck minded" as the defense program advances and as the need develops for a much greater acceleration in production of war material.

Emphasis in industrial strikes apparently has passed to plants with defense orders, some union leaders feeling that such emphasis, while it courts the danger of restrictive legislation and a complaining public, is the better union strategy.

Union grievances over which strikes have been called in the last three months are relatively vague when compared with the reasons for walkouts during the first seven months of 1940. Last year's important strikes were mostly over wages. Although the issue of higher wages has become still more lively, causes of strikes from Jan. 1 to March 30 are listed most frequently under the indefinite heading "union relations."

Evidently the "quality" rather than the number of the recent and current strikes in U. S. industry should interest the House Military Affairs Committee (which is now investigating the defense program), the National Defense Mediation Board and other agencies engaged in speeding defense production of guns, planes, tanks and ships.

Analysis of the strike record in the last 10 months suggests that public acknowledgment of shortages in certain raw materials such as aluminum, zinc, copper and other raw materials seems to have increased activity of union labor leaders at certain vital plants.

For the first three months of 1940 strikes in the larger industrial plants of the country have cost the National Defense Program an average of 199,640 man-days a month. This compares with an average of 71,428 man-days a month during the June-December period of 1940.

Qualitatively, however, the losses of strikes since Jan. 1 have been vastly more significant than in the last seven months of 1940 because the 1941 strikes have crippled such vital plants as that of Allis-Chalmers Corp., a "bottleneck" plant, of the Vanadium Corp. of America, and other important units. A strike in a plant of this type, from a defense viewpoint, is not offset in labor statistics by 500 strikes in, for instance, textile plants.

Strikes in the steel and metalworking industries are only slightly more frequent this year than in 1940 but are continuing for longer periods and are occurring oftener at plants needed in national defense.

Twenty-two strikes have occurred in the steel and allied industries in the last three months, compared with 40 strikes in the same industries in the last seven months of 1940, the total of ten months covering the period of the intensified National Defense Program.

In estimating man-days lost in 1941 and 1940, THE IRON AGE does not include smaller plants, slowdowns, or stoppages in some plants for which accurate figures on time loss could not be obtained. They do not, of course, include heavy losses due to the Ford Motor Co. strike, which began April 1, and to other shutdowns which have been reported in April.

The CIO, headed by Philip Murray, who is also head of the SWOC, maintains its lead so far in 1941 for strikes called, or staged without consent of union leaders. The CIO, which is more active in the metalworking industry, has sponsored 18 out of the 22 important strikes occurring in January, February or March, compared with four for AFL affiliates. In the last seven months of 1940—the early part of the defense tooling-up period—the CIO was involved in 29 strikes, against 11 for the AFL.

While much attention has been given to the evils of jurisdictional strikes in some industries, none of the 22 metal-working plant strikes appearing in 1941 records of the Office of Production Management appears to be primarily due to disputes between unions.

Meanwhile, industry is beginning the second quarter of 1941 with threats of "still bigger and better" strikes keeping pace with the increased need for increasing mass-production of war materials.

racy is the front line trench of the battle to preserve democracy in America."

Thus the Communist party declared in a four-page circular which it distributed at Communist party headquarters here. Distribution took place day before settlement of the strike occurred in Washington.

Pamphlet also declared: "Support the Allis-Chalmers strikers. Defeat the war profiteering company." Attacks were made on President Roosevelt for "imprisoning Earl Browder"; on Navy Secretary Knox and William S. Knudsen for their "strike-breaking attempt to govern by decree"; on Governor Heil and Mayor Zeidler for "having themselves deputized and mobilizing police equipment"; on the AFL, the Socialist party, congressmen, company officials and the press.

Progress Slight in Settling Ford Strike

Detroit

• • • **Only slight progress** could be reported in attempts to settle the UAW-CIO strike against Ford Motor Co. as the strike entered its second week. James F. Dewey, federal labor conciliator, and Gov. Murray D. Van Wagoner continued to sound optimistic and could report Monday night that they had conferred in a secret session with high Ford officials who had not previously met them to discuss plans to bring about a settlement. However, there was no indication that the company had agreed to meet with the UAW.

An estimated 200,000 workmen, including Ford employees throughout the country and employees of supplying plants were out of work as a result of the strike.

New Bullet Core Steel Plant for Allegheny Ludlum

Washington

• • • **A $2,500,000 plant** for Allegheny Ludlum Steel Corp. in Dunkirk, N. Y., and a $1,108,901 plant for the Pullman Standard Car Mfg. Co., at Chicago, will be constructed by the Defense Plant Corp., RFC subsidiary, for the production of bullet core steel and aircraft parts.

An estimated $2,100,000 will go for tools and equipment at the Dunkirk plant, which will produce bullet core steel and other alloy steels. The Chicago plant will turn out aircraft parts. About $284,000 will be expended for machines and portable tools.

The DPC will retain title to property and facilities at both plants.

Subcontract Inquiries Increase at Pittsburgh

Pittsburgh

• • • **Inquiries for** National Defense subcontract work totaling approximately $10,000,000 have been received by the Pittsburgh Commission for Industrial Expansion and the Emergency Committee of the Pittsburgh District.

The inquiries come from holders of prime defense contracts in all parts of the United States and have come as the direct result of combined efforts of the Industrial Commission and the Emergency Committee to mobilize the spare capacities of factories of every size and description for national defense.

This activity has been under the joint supervision of Wm. B. McFall, chairman of the Emergency Committee, and C. E. Robinson, secretary-manager of the Industrial Commission.

Since Jan. 1, subcontracts totaling more than $200,000 have been let to five Pittsburgh district firms and within the next few weeks more orders will be placed with manufacturers in the Pittsburgh district defense "pool."

Eleven counties of Western Pennsylvania are included in the Pittsburgh district in the "pool" served by the Industrial Commission and the Emergency Committee. These counties include: Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Mercer, Washington and Westmoreland.

The Emergency Committee and the Industrial Commission undertook a survey sponsored by the National Association of Manufacturers shortly after the first of the year. The survey was conducted nationally in response to a call from Washington for an "all-out mobilization" of United States manufacturing facilities.

More than 700 firms, ranging from the small one-man shop to the largest factories and plants in the district responded to the call. Plant facilities, personnel, equipment and spare capacities were logged in this, the most comprehensive survey ever made in the Pittsburgh industrial area.

Plants were listed employing upwards of 60,000 persons.

Nickel Scrap Out of Line, Henderson Says

Washington

• • • Describing prices on nickel scrap and nickel alloy scrap as "way out of line," with some nickel scrap purportedly selling at $1 a lb., Leon Henderson's Price Stabilization Division on Tuesday threatened to invoke the Government's price fixing machinery unless the price is brought into line with the 35c. per lb. price for primary nickel.

Mr. Henderson listed secondhand machine tools, aluminum scrap, aluminum ingot, zinc scrap and slab zinc, as materials on which ceiling prices already have been fixed by his division, and urged all factors in the industry to make voluntary price adjustments. Holders of nickel scrap were asked to release their stocks.

Institute Issues Handbook On Welded Steel Tubing

• • • **For use of designers** and fabricators there has been made available in multiple ring binder extensive data on the physical, chemical and metallurgical properties of welded carbon and alloy steel tubing, together with commercial tolerance limits and a great deal of engineering data. In this Handbook of Welded Steel Tubing, revised Jan. 15, 1941, and published by the Formed Steel Tube Institute, 1621 Enclid Avenue, Cleveland, the inherent advantages of such tubing are told and the various methods of making the product described and illustrated. A list of typical applications is included. The handbook may be obtained from the institute for $1.

Belden Adopts Pension Plan

Chicago

• • • **Employee retirement** pension plan has been approved by stockholders of the Belden Mfg. Co. Plan provides retirement at age of 65 with payments approximating 50 per cent of average annual earnings from the age of 35 until retirement. Company and employees will share cost of the plan, which is based on at least five years of service and attainment of the age of 35.

Machine Tool Exports To Britain Drops 50%

Washington

• • • **A sharp decrease** in the United States exports of power-driven metalworking machinery is shown by preliminary statistics for the month of February, the Machinery Division, Department of Commerce, reports.

February shipments of power-driven metalworking machinery were 32 per cent below the January level, owing chiefly to reduced exports to Great Britain. However, February exports of all industrial machinery from the United States totaled $37,493,575, only 13 per cent below the January value of $42,931,123, due to the substantial gains recorded for power-generating, textile, and construction machinery and numerous other types of industrial equipment.

Machine tool exports to England dropped from $16,902,862 in January to $8,674,766 in the following month and England's share in the total United States machine tool exports declined from 77 to 58 per cent. Shipments to Canada continued to increase, totaling $4,272,527 in February as against $3,806,043 in January. Exports to Japan declined to $16,930 from $217,268, while consignments to Russia rose to 484,542 from the $95,238 recorded in January.

February exports of power-driven metalworking machinery, the lowest since last July, amounted to $16,544,102 as compared with $24,400,387 in January, and $28,753,334 in December when the all time record total was recorded. February shipments of lathes were valued at $3,005,665 as against $4,827,926 in the preceding month; exports of milling machines amounted to $3,156,497 as compared with $5,804,191; grinder shipments came to $2,838,031 as against $3,391,971; and drilling machines worth $1,168,805 were shipped abroad compared with $1,775,048 in January. A sharp drop in exports to Russia and reduced shipments to Canada brought the February total for rolling mill equipment down to $505,321 from the $1,400,676 recorded in the preceding month.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **Reese F. Clifford** has been named personnel director of the Western Electric Co., Inc., New York. Mr. Clifford has 30 years of service with Western Electric, having started at the company's Hawthorne works, Chicago, in 1910 as a price clerk. Twelve years later he was made assistant accountant. After serving as assistant clerical superintendent of the Kearny, N. J., Works for four years and superintendent of the production of panel dial telephone switching equipment at the Hawthorne Works, he was made manager of the cable and apparatus division there in 1938. Since January of this year, he has been located at Western Electric headquarters in New York as the company's assistant personnel director.

• **O. M. Poock** has been elected chairman of the board of the Sheffield Corp., Dayton, Ohio, a new organization resulting from the merger of the two affiliated companies, the Cimatool Co. and the Sheffield Gage Corp. Mr. Poock became associated with the Cimatool Co. in 1914 when it was known as the City Machine & Tool Works. In 1922 he became president of the Cimatool Co. and in 1933 he was made treasurer of the Sheffield Gage Corp. **Louis Poock,** general manager of the Sheffield Gage Corp. since 1933 and of the Cimatool Co. since 1931, was elected president and general manager.

LOUIS POOCK, president and general manager of the new Sheffield Corp., Dayton, Ohio.

• **L. M. Lindsey,** who has been in charge of the malleable iron annealing, non-ferrous wire open flame annealing and vitreous enameling furnaces divisions of the Surface Combustion Corp. for the past six years, has been named engineering sales manager of the General Alloys Co., Boston. **Roger Sutton** has been appointed director of engineering and metallurgy of the company. A graduate of the University of Detroit, Mr. Sutton was previously employed by the Chrysler Corp., where he was in charge of shop development work and also an instructor in chemistry and metallurgy at the Chrysler Institute of Engineering.

• **A. C. Danekind,** of General Electric Co.'s executive department, Schenectady, N. Y., has been assigned to the Office of Production Management.

• **W. Alexander McCune, Jr.,** has been appointed field engineer for the Philadelphia territory by the abrasive division of Norton Co., Worcester, Mass. Mr. McCune was in the laboratories and sales engineering department in Worcester before going to Philadelphia.

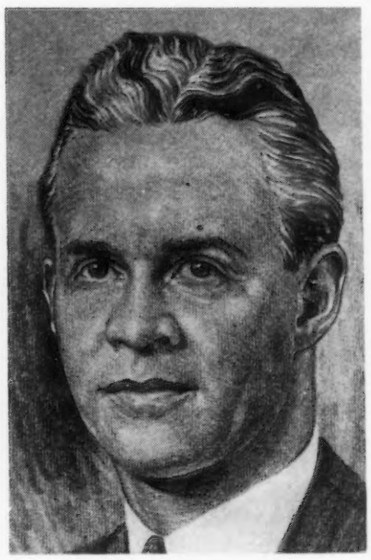
• **George L. Todd,** comptroller of the Bullard Co., Bridgeport, Conn., has been named to fill the vacancy left on the board of directors by the resignation of Thomas N. Dunn.

• **F. A. Bancroft** is retiring from the position of chief accountant at the Worcester works of American Steel & Wire Co. after 49 years of service. Mr. Bancroft started working for the Washburn & Moen Co., a predecessor company of American Steel & Wire, as a weigher in March, 1892. **F. G. Peterson,** assistant chief clerk at Worcester works, has been appointed chief clerk and **F. V. Bentley,** general clerk at South Works, has been named to succeed Mr. Peterson.

• **C. R. Wade,** sales engineer of the tool steel division of the Crucible Steel Co., of America, Halcomb Works, Syracuse, N. Y., addressed the Springfield, Mass., chapter of the American Society for Metals, April 1. The title of his address was "Tensile Properties of Metals."

• **Charles S. DeMuth,** manager of sales and assistant treasurer of Lyon, Conklin & Co., Inc., Baltimore, has been given a testimonial dinner to commemorate the 50th anniversary of his employment with the company.

• **John W. Perry, Jr.,** sales manager, has been elected vice-president of Grede Foundries, Inc., Milwaukee, which operates the Milwaukee Steel Foundry Co. at Milwaukee, Liberty Foundry,



J. K. BEESON, whose election as vice-president in charge of sales of the Pittsburgh Steel Co., Pittsburgh, was announced in these columns last week.

Wauwatosa, Wis., and the Spring City Foundry, Waukesha, Wis. He has been with the Milwaukee plant since 1936 and will continue as general sales manager of the combined foundries.

• **Joseph P. Schwada,** Milwaukee city engineer since 1923, has been reappointed by Mayor Carl Zeidler.

• **H. E. Weihmiller,** formerly Eastern representative and from 1937 a vice-president of Consolidated Aircraft Corp., San Diego, Cal., who has been away from the company for approximately a year, has rejoined the corporation in his former capacity. He will handle the Washington office and Eastern activities.

• **A. M. Wolf** has been transferred to the St. Louis office of Cutler-Hammer, Inc., Milwaukee. A graduate electrical engineer from the Armour Institute of Technology, Mr. Wolf was employed by the Public Service Co. of Northern Illinois in the sub-station construction department before joining the Cutler-Hammer organization.

• **Charles Sumner Williams** has retired as chairman of the board of Thomas A. Edison, Inc., West Orange, N. J., and as an officer and director of various affiliated companies. The position of chairman of the board has been abolished, but **Arthur Walsh,** executive vice-president will succeed to the duties.

• **George W. Veale,** former manager of the bumper division and more recently with the axle division in Cleveland; **Daniel Dewey,** manager of the stamping division in Cleveland; **Charles C. Bradford,** manager of the heater division in Cleveland, and **Joseph L. Dostal,** manager of the foundry division in Vassar, Mich., have been elevated to vice-presidencies of the Eaton Mfg. Co., Cleveland.

• **W. K. (Ken) Ebel,** chief engineer of the Glenn L. Martin Co., Baltimore, has been named vice-president in charge of engineering. Mr. Ebel, the first to fly the China Clipper, will retain his old title of chief test pilot. A graduate of the Case School of Applied Science, he joined the Martin company in 1922 as a draftsman.

• **Henry W. Phelps,** chairman of the board since 1936, has resigned from the American Can Co., New York, but will continue in an advisory capacity. The office of chairman of the board will be abolished. Mr. Phelps has served the American Can Co. since its formation in 1901, having been assigned as district manager of sales for packers' cans at that time. A year later he was transferred to San Francisco as general manager of the Pacific District, including the Hawaiian Islands. In 1905, Mr. Phelps came to New York as general manager of sales and in 1913 he became vice-president but continued as general sales manager until 1923 when he was elected president of the company.

• **R. S. Marthens,** formerly manager of the Westinghouse gearing division, has been appointed staff assistant to the manager of the Canton ordnance division at Canton, Ohio. The Canton plant when completed will be operated by the Westinghouse Electric & Mfg. Co., East Pittsburgh, and owned by the U. S. Government. Mr. Marthens is widely known in industrial circles, having served as treasurer of the A.G.M.A. during 1939 and 1940.

Obituary

• **Alfred M. Mosscrop,** civil engineer, died March 28 at Rochester, N. Y., aged 76 years. Mr. Mosscrop, who was born in Brooklyn, graduated from Cornell University in 1885, and after working on bridge construction in St. Louis returned to Cornell as an instructor in the College of Civil Engineering. Later he was associated with the Rochester Bridge & Iron Works, the Rochester plant of the American Bridge Co., the Baltimore Bridge Co., Baltimore, and Dorman Long & Co., Ltd., Middlesbrough, England. Upon America's entrance into the World War he became production manager for the Rochester District, Ordnance Dept., U. S. Army. He retired 22 years ago.

• **Norman K. Schaller,** treasurer of the Superior Steel Corp., Pittsburgh, died on April 3.

• **James M. Milliken,** for 18 years treasurer and director of the Midvale Co., Philadelphia, died April 2 at his home in that city. Mr. Milliken had been a steel man for more than half a century, having become an employee of the Carnegie Steel Co. at Homestead in 1888. He was later transferred to the Carnegie Duquesne works and for the last 26 years had been with the former Midvale Steel & Ordnance Co. and the Midvale Co.

• **P. C. Morganthaler,** aged 61, assistant manager of the Fort Wayne works of the General Electric Co., died March 29. He had been associated with the General Electric Co. for 44 years.

• **Almon A. Bush,** vice-president of E. D. Jones & Sons Co., Pittsfield, Mass., manufacturers of paper mill machinery, died in that city April 1. He was born in Michigan 77 years ago, joined the Pittsfield company in 1902 as salesman, and was made vice-president and manager in 1928.

• **Edward B. Taylor,** who retired two years ago as personnel director and employment manager of the Wickwire Spencer Steel Co., Palmer, Mass., died April 3, at St. Petersburg, Fla. Mr. Taylor was born in Collinsville, Conn., 82 years ago.

• **Charles W. Weiss,** 89 years old, who was chief master mechanic at the American Car & Foundry Co. for 48 years until his retirement 15 years ago, died recently at Detroit.

• **J. W. Wilford,** 63 years old, president of Melling Forging Co., Lansing, Mich., and president of the Bank of Lansing, died April 7. Mr. Wilford was at one time connected with Saginaw Products Co. and was general manager of Central Gear & Forge before it became a part of General Motors Corp. as the Chevrolet Gear & Axle plant.

• **George D. Clifford,** founder of Youngstown Wire & Iron Co., Youngstown, died March 26, at the age of 72.

Pig Iron Production Up 2.8% in March

PRODUCTION of coke pig iron in March totaled 4,704,135 net tons, a new peak, compared with 4,197,872 tons in February and with 3,270,499 tons in March, 1940.

The daily average output last month was 152,750 tons, a gain of 2.8 per cent over the February daily average of 148,555 tons. The operating rate in March was 96.9 per cent of capacity against 95.2 per cent in February.

Total of 4,704,135 net tons is a new peak and was equal to 96.9% of industry's rated capacity . . . 205 furnaces in blast.

On April 1 there were 205 furnaces in blast, a net gain of 3 over the 202 that were in blast on March 1.

Four furnaces were put in blast as follows: Bethlehem Steel Co., one at Buffalo; Carnegie-Illinois Steel Corp., one at Youngstown; National Tube Co., one at Lorain; and Youngstown Sheet & Tube Co., one at South Chicago. One furnace went out of blast, a Fairfield, Ala., stack of Tennessee Coal, Iron & Railroad Co.

Production by Districts and Coke Furnaces in Blast (In Net Tons)

	March, 1941	Daily % of Capacity	Feb., 1941	Daily % of Capacity	March, 1940	April 1, 1941 No. in Blast	April 1, 1941 Operating Rate	March 1, 1941 No. in Blast	March 1, 1941 Operating Rate
Eastern	38,862	106.4	32,459	98.2	.....	2	1,255	2	1,160
Buffalo	269,335	88.7	238,396	86.8	224,941	12	8,700	11	7,850
Philadelphia	402,094	91.0	366,755	98.0	386,057	17	12,970	17	13,310
Ferro. and Spiegel	18,831	114.0	16,884	114.0*	17,972	4	605	4	605
Pittsburgh	1,134,173	95.3	1,001,000	94.0	803,794	46	36,585	47	35,750
Ferro. and Spiegel	34,367	79.3	25,297	64.6	43,452	4	1,110	3	905
South Ohio River	102,071	93.8	89,284	90.7	75,219	7	3,295	7	3,190
Valleys	557,946	101.0	520,356	98.7	252,591	23	18,845	22	17,660
Wheeling	218,750	106.5	198,878	107.0	172,859	9	7,055	9	7,105
Cleveland	418,684	103.0	342,942	93.0	254,119	17	13,560	16	12,250
Chicago	1,002,502	94.7	889,577	93.0	603,277	37	32,340	36	31,770
St. Louis	.....	...	.....	...	.....	0	.....	0	.....
Detroit	115,955	99.9	105,664	100.7	111,072	5	3,740	5	3,775
Western	67,793	107.8	62,069	109.3	50,367	4	2,185	4	2,215
Southern	320,510	107.7	306,242	113.0	269,199	17	10,340	18	10,935
Ferromanganese	2,262	25.2	2,069	25.0	5,580	1	75	1	75
Total	4,704,135	96.9	4,197,872	95.2	3,270,499	205	152,750	202	148,555

*Revised.

Production of Coke Pig Iron and Ferromanganese

	Pig Iron* 1941	Pig Iron* 1940	Ferro-Mn† 1941	Ferro-Mn† 1940
January	4,663,695	4,032,022	35,337	43,240
February	4,197,872	3,311,480	33,627	38,720
March	4,704,135	3,270,499	55,460	46,260
April	.....	3,137,019	.....	43,384
May	.....	3,513,683	.....	44,973
June	.....	3,818,897	.....	44,631
½ year	.....	21,083,600	.....	261,208
July	.....	4,053,945	.....	43,341
August	.....	4,238,041	.....	37,003
September	.....	4,176,527	.....	33,024
October	.....	4,445,961	.....	32,270
November	.....	4,403,230	.....	31,155
December	.....	4,547,602	.....	35,666
Year	.....	46,948,906	.....	473,667

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1941	Per Cent Capacity	1940	Per Cent Capacity
January	150,441	95.5*	130.061	85.8
February	149,924	95.2	114,189	75.1
March	151,745	96.9	105,500	68.9
April	.....	...	104,567	68.6
May	.....	...	113,345	74.8
June	.....	...	127,297	83.9
½ year	.....	...	115,844	76.1
July	.....	...	130,772	86.3
August	.....	...	136,711	90.4
September	.....	...	139,218	92.2
October	.....	...	143,418	94.8
November	.....	...	146,774	97.1
December	.....	...	146.697	97.2
Year	.....	...	128,276	84.6

*Revised for capacity as of Dec. 31, 1940.

Merchant Iron Made, Daily Rate

	1941	1940	1939
January	20,812	16,475	11,875
February	21,254	14,773	10,793
March	23,069	11,760	10,025
April	.....	13,656	9,529
May	.....	16,521	7,883
June	.....	13,662	8,527
July	.....	16,619	9,404
August	.....	17,395	11,225
September	.....	17,571	12,648
October	.....	18,694	16,409
November	.....	22,792	16,642
December	.....	19,779	16,912

Metal Working Activity

. . . Latest Data Assembled by The Iron Age
From Recognized Sources. In Net Tons.

	Feb. 1941	Jan. 1941	Feb. 1940	12 Months 1940	12 Months 1939
Steel Ingots:					
Monthly output[a]	6,250,413	6,943,084	4,527,141	66,993,219	52,798,714
Average weekly output[a]	1,562,603	1,567,288	1,093,512	1,281,431	1,012,634
Per cent of capacity[a]	96.8	97.1	70.0	82.1	64.7
Pig Iron:					
Monthly output[b]	4,197,872	4,663,695	3,311,480	46,948,906	35,317,374
Raw Materials:					
Coke output[c]	4,998,491	5,446,989	4,172,042	56,747,585	44,425,123
Lake ore consumed[d]	6,353,946	7,090,740	4,750,860	69,917,472	49,684,644
Scrap iron consumed	4,673,000	4,794,000	3,420,000	46,689,000	39,207,000
Castings:					
Malleable, orders[e]	.....	81,089	34,901	571,929	489,482
Steel, orders[e]	.....	110,579	40,913	816,919	685,074
Finished Steel:					
Trackwork shipments[a]	7,973	6,835	6,898	79,539	68,363
Fabricated shape orders[f]	159,815	266,594	98,882	1,748,144	1,305,049
U. S. Steel Corp. shipments[g]	1,548,451	1,682,454	1,009,256	14,976,110	11,707,251
Fabricated Products:					
Automobile production[h]	485,523	500,931	404,032	4,469,354	3,577,292
Steel furniture shipments[e], value	$3,368,019	$3,152,013	$2,263,969	$29,759,591	$22,609,168
Steel boiler orders[e] (sq. ft.)	1,543,821	2,210,047	558,108	17,233,295	11,098,316
Locomotives ordered[i]	127	78	13	677	415
Freight cars ordered[i]	5,645	14,118	2,748	64,871	56,915
Foundry equipment index[k]	281.1	285.3	135.7	183.7†	*
Gear sales index	262	259	116	155†	103†
Non-Ferrous Metals: (U. S. only)					
Lead shipments[l]	54,852	55,707	39,176	603,143	555,074
Lead stocks[l]	46,604	47,248	72,658	.....	.....
Zinc shipments[m]	59,220	63,272	51,050	696,497	598,972
Zinc stocks[m]	4,962	8,768	65,869	.....	.....
Tin deliveries[n]	13,658	14,291	7,392	129,357	80,523
Refined copper deliveries[o]	112,808	119,736	63,215	1,001,886	814,407
Refined copper stocks[o]	97,689	116,854	145,393	.....	.....
Exports:					
Total iron and steel[p]	.....	782,715	751,857	11,881,663	6,805,600
All rolled and finished steel[p]	.....	316,493	353,095	4,590,734	2,109,527
Semi-finished steel[p]	.....	312,432	95,061	3,310,718	368,360
Scrap[p]	.....	50,462	261,714	3,161,859	3,977,780
Imports:					
Total iron and steel[p]	.....	474	7,549	64,179	352,980
Pig iron[p]	.....	.....	2,276	11,471	43,223
All rolled and finished steel[p]	.....	342	1,568	14,830	175,512

Sources of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary estimates by THE IRON AGE—Final figures from Bureau of the Census, U. S. only; [i] *Railway Age*; [j] National Machine Tool Builders Association; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [r] Institute of Scrap Iron and Steel; [s] American Gear Manufacturers Association.

* Not available. † Monthly averages.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Apr. 8, 1941	Apr. 1, 1941	Mar. 11, 1941	Apr. 9, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	Apr. 8, 1941	Apr. 1, 1941	Mar. 11, 1941	Apr. 9, 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$24.84
No. 2 Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	19.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	30.34	30.34	30.34	30.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	*$20.00*	$21.00	$21.00	$16.25
Heavy melt'g steel, Phila.	*18.75*	20.00	20.00	16.75
Heavy melt'g steel, Ch'go	*18.75*	19.75	20.00	15.125
Carwheels, Chicago	....	20.25	20.25	16.75
Carwheels, Philadelphia	....	23.00	23.00	20.25
No. 1 cast, Pittsburgh	....	23.25	22.75	17.75
No. 1 cast, Philadelphia	*23.75*	25.75	24.50	20.25
No. 1 cast, Chicago*	*22.60*	21.25	20.75	14.75

*Changed to gross ton basis.

Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$5.625	$5.625	$5.50	$4.00
Foundry coke, prompt	6.25	6.25	5.75	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	11.50
Copper, Lake, New York	12.00	12.00	12.00	11.50
Tin (Straits), New York	51.75	51.75	51.875	47.00
Zinc, East St. Louis	7.25	7.25	7.25	5.75
Lead, St. Louis	5.70	5.70	5.60	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 135-144 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
April 8, 1941	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.261c. a Lb.	$23.61 a Gross Ton	$20.25 a Gross Ton
One month ago	2.261c. a Lb.	$23.45 a Gross Ton	$20.33 a Gross Ton
One year ago	2.261c. a Lb.	$22.61 a Gross Ton	$16.04 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1941			$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.261c., Jan. 2	2.211c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08. Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Increase, initiated by National Steel Corp., raises question of steel prices anew . . . Coal strike affecting blast furnaces dependent on beehive coke . . . Ore season opens but prices are awaiting wage settlement . . . Steel orders undiminished.

ALTHOUGH the threatened strike at plants of the United States Steel Corp. has been averted, temporarily at least, pig iron and steel output will be affected shortly unless there is a speedy settlement of the coal miners strike and resumption of mining operations.

One blast furnace at the Edgar Thomson Works of the Carnegie-Illinois Steel Corp. at Braddock, Pa., which depends on beehive coke, has been shut down and other furnaces may be forced to bank the latter part of this week unless a supply of coal is shipped to beehive ovens in Western Pennsylvania.

While the number of blast furnaces wholly dependent on beehive coke is negligible, because the majority use by-product coke, any work stoppage at this time seriously threatens maximum output of steel.

The Ford Motor Co. strike has resulted in the banking of blast furnaces and the shutting down of all open hearths, resulting in a reduction of 15 points in the Detroit district rate to 73½ per cent. This stoppage, in turn, accounts mainly for a decline of one point to 99 per cent in the average rate for the industry. There have been lesser decreases in steel output in the Chicago, Youngstown and Southern Ohio districts, chiefly because of repair shutdowns, and increases at Buffalo and Cleveland.

THE surprise announcement by the National Steel Corp. of a wage increase of 10c. per hr., just as negotiations were being resumed between the Carnegie-Illinois Steel Corp. and the Steel Workers Organizing Committee, under an arrangement whereby the deadline was set ahead to April 15, raises anew the question of steel prices.

It has consistently been the contention of steel companies that a wage increase not in excess of 5c. per hr. might be absorbed without increasing prices, but that a rise in excess of 5c. would necessitate higher prices unless profit margins are to be seriously depleted.

The real bone of contention in the U. S. Steel-SWOC discussions has not been wages, however, but the checkoff payment of dues, to which the entire steel industry is utterly opposed. At the time the National Steel announcement was made it was said that the SWOC demands were about to be settled on the basis of 8c. per hr. without the checkoff.

No other steel company has as yet followed the lead of National Steel. If the major steel companies raise wages and do not increase prices, there is the possibility that some of the smaller, non-integrated companies will be forced to do so in self protection.

It is estimated in the trade that a 10c. per hr. increase applied throughout the North plus the additional coal mining cost caused by higher wages in that field will add $2 to $3 a ton to the cost of finished steel products. Moreover, there may also be an advance in iron ore prices. A 16 per cent rise in the base wage of ore miners would add about 20c. a ton to the cost of ore. Although the Great Lakes ore carrying season has opened with the arrival of some boats at Lower Lake ports, the season's ore prices are being withheld until the wage question is definitely settled.

AN almost complete cessation of trading in iron and steel scrap has followed the announcement of government-fixed prices. One of the most confusing features of the price schedule was the ruling that all contracts entered into before April 3 shall be completed by April 10. Scrap dealers have appealed for an extension of 30 or 60 days on contract commitments, while many buyers and sellers assert they have no intention of abrogating legal contracts, and it is believed that the Price Stabilization Division will make exceptions in bona fide contract cases. On many grades of scrap that have been commonly traded no government prices were announced, and for the first time in the history of the scrap trade there are no quotations that can be published as there will be no transactions until the situation is clarified.

STEEL orders are pouring in to the mills at an undiminished rate, in some instances in excess of March tonnage. Curbs are being applied in various directions. For example the automobile industry has been told that it cannot have as large a tonnage of steel as it desires for 1942 models to be produced in the last half. Further extension of priority and price control from Washington appears to be certain.

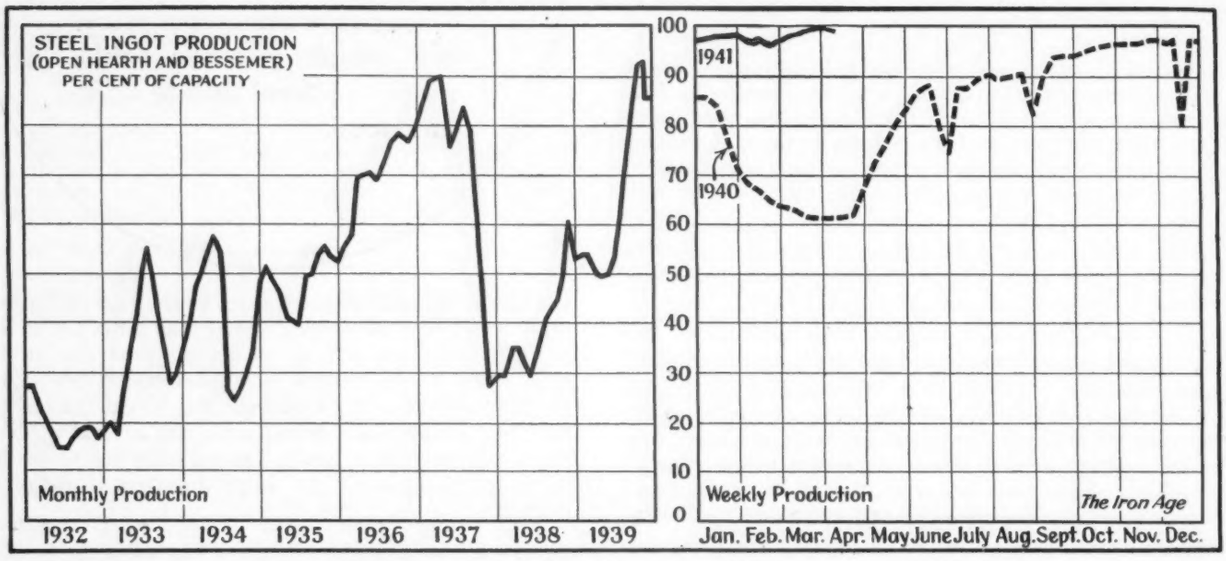
Pig iron production, making a new high, totaled 4,704,135 net tons in March against 4,197,872 in February. The daily average of 152,750 tons in March showed a gain of 2.8 per cent over the February average of 148,555 tons. On April 1 there were 205 furnaces in blast, a gain of three during the month.

The Industrial Pace . . .

A DROP OF OVER 10 POINTS in the automobile series and a decline of 2.6 points in the heavy construction component lowered THE IRON AGE index of capital goods activity to 117.0 in the past week, as compared with 119.0 in the preceding week, 123.0 a month ago, and 76.3 in the corresponding week of 1940. Automobile assemblies were down to 116,255 from 124,165 two weeks ago. The construction series stood at 152.3, as against 159.4 in the week ended March 8. Lumber carloadings advanced 1.7 points in the week, while activity in the Pittsburgh district was up fractionally.

ALTHOUGH both the monthly and daily average consumption of iron ore in February, 5,673,166 tons, were off from the January total of 6,331,018 tons, they were 40 per cent heavier than February, 1940, when 4,241,839 tons were consumed. Daily coke production in February was heavier than in January, although total production of 4,998,491 tons was 8.2 per cent below January, and almost 20 per cent above February, 1940. Production of electric energy expanded further in February, when daily production averaged 439,758,000 kw-hr., higher than January, and 14 per cent above February, 1940.

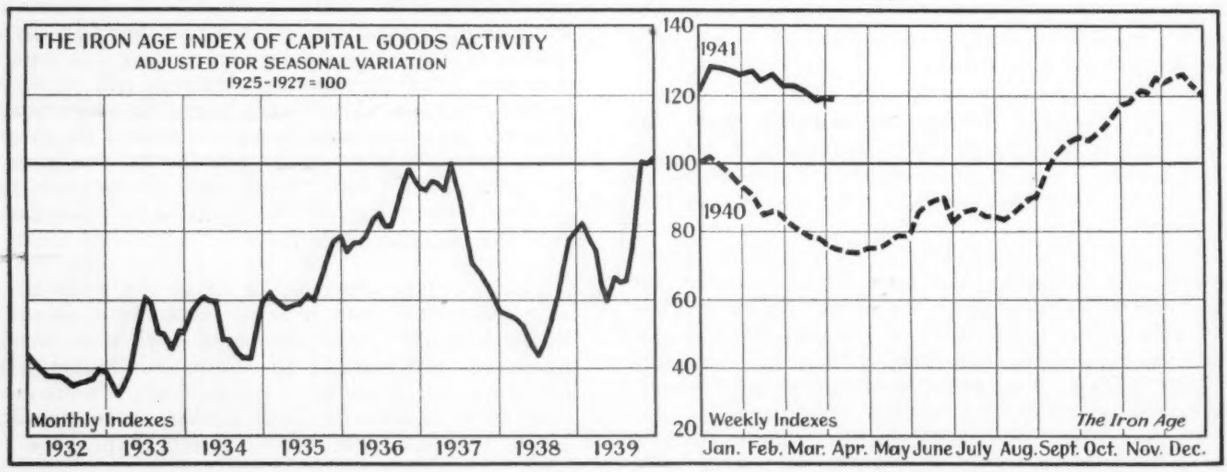
Ingot Production Declines to 99%


STEEL INGOT PRODUCTION
(OPEN HEARTH AND BESSEMER)
PER CENT OF CAPACITY
Monthly Production
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Production
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
100 90 80 70 60 50 40 30 20 10 0

District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week . .	102.0	101.0	99.0	96.0	99.0	104.5	85.0	73.5	95.0	108.5	102.5	111.0	95.5	99.0
Previous Week . .	102.0	101.5	101.0	96.0	97.0	100.5	85.0	87.5*	95.0	112.0	102.5	111.0	95.5	100.0

*Corrected.

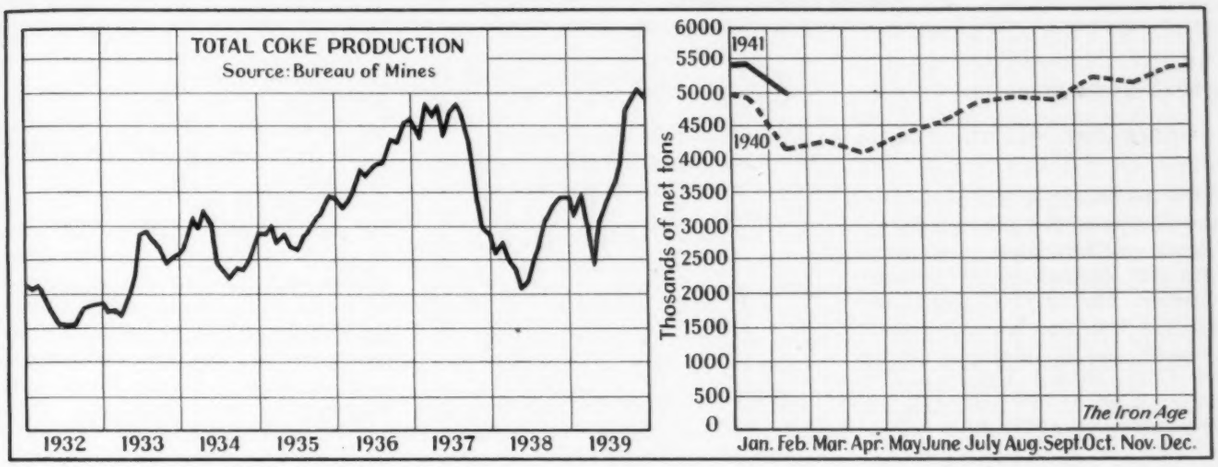
Capital Goods Index Down Two Points


THE IRON AGE INDEX OF CAPITAL GOODS ACTIVITY
ADJUSTED FOR SEASONAL VARIATION
1925-1927 = 100
Monthly Indexes
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Indexes
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
140 120 100 80 60 40 20

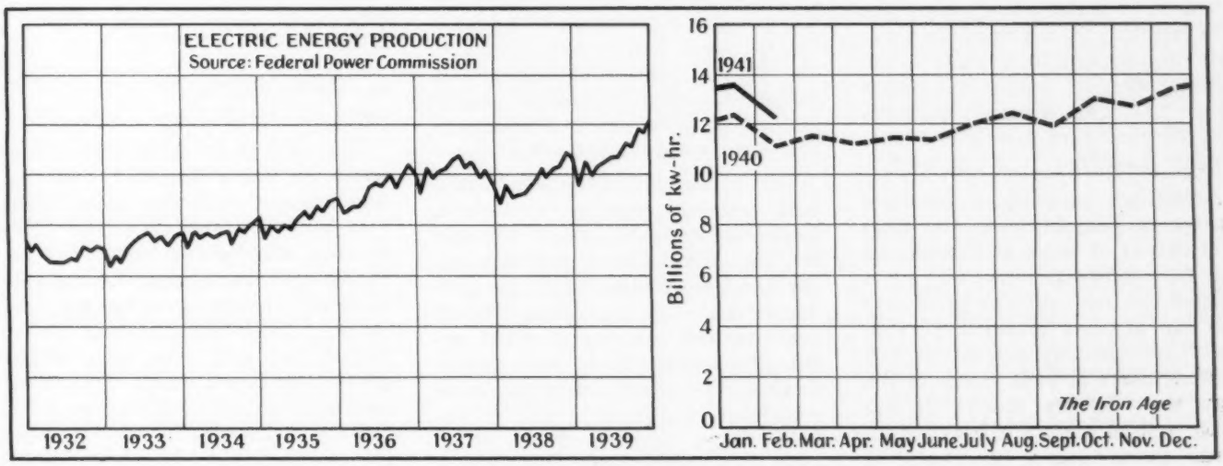
▼Component Week Ended ➤	Apr. 5	Mar. 29	Mar. 8	Apr. 6 1940	Apr. 6 1929
Steel ingot production[1]	132.8	132.8	130.2	79.0	122.2
Automobile production[2]	100.1	110.2	125.5	87.5	126.2
Construction contracts[3]	152.3	154.9	159.4	71.3	149.8
Forest products carloadings[4]	72.1	70.4	74.5	57.5	131.9
Pittsburgh output and shipments[5]	127.8	126.9	125.4	86.2	117.7
COMBINED INDEX	117.0	119.0	123.0	76.3	129.6

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended March 29. Other indexes cover week of April 5.

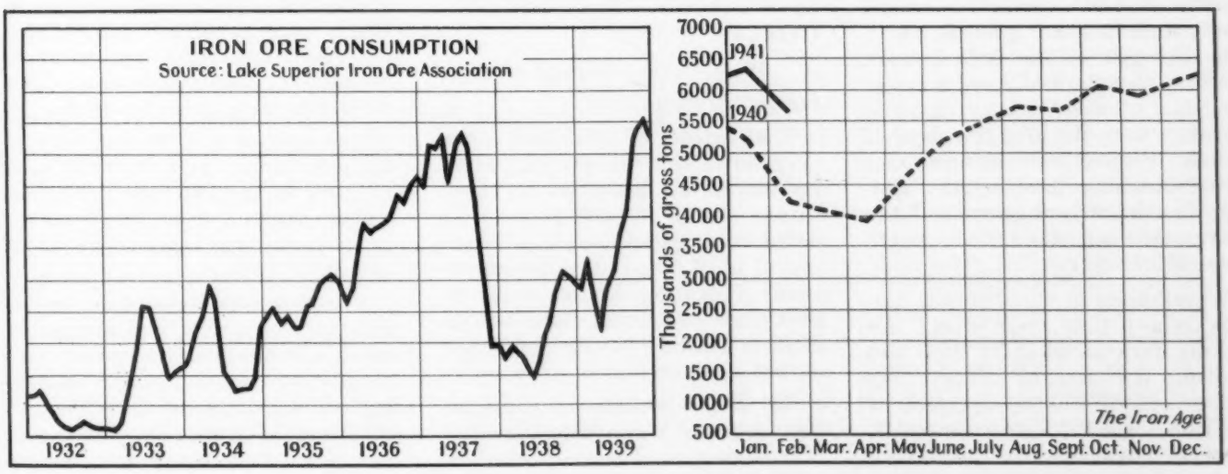
Daily Coke Production Higher in February



Rate of February Power Output 14% Above 1940



Ore Consumption Off From January Peak



Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . Heavy flow of orders continues

With the threat of a major steel strike dissipated for the time being at least, PITTSBURGH steel producers and consumers are breathing easier. The surprise announcement of a 10c. per hr. increase in wages by E. T. Weir, National Steel Corp. board chairman, is causing all kinds of speculation as to the future trend of steel prices.

Meanwhile, new business continued to roll in at PITTSBURGH in undiminished volume. Extreme pressure is still being exerted by the automobile companies for rapid shipment of material on books. The auto industry is not receiving material as fast and in as great a volume as desired owing to allocations, national defense projects, and the fact that the industry is already operating at a top level.

Armament tonnage is growing greater in proportion to the total steel output of mills at CLEVELAND and YOUNGSTOWN, providing a sterner test not only for producers who are anxious to serve all customers as equitably as possible, but for steel users as well. Some of the large new defense manufacturing plants will be ready for heavy shipments soon. Large tonnages of shell steel are due to come out, and demand for steel plates, principally for shipbuilding, continues to rise.

While orders have declined slightly at CHICAGO for the second week, that is not a general condition throughout the industry. In the first four days of April a major producer recorded a heavy gain in bookings over the first few days of March. Production continues at a record-breaking pace in the Chicago district, where operations are above rated capacity for the fourth consecutive week.

Warehouses in the CHICAGO district report that their stocks are sinking fast, so most of them are limiting the size of orders they will accept. With the prospect of additional shell forging contracts, forgers engaged in commercial work face the upsetting of their schedules.

Bookings at BIRMINGHAM for the first part of April show little variation in volume from the flood of orders received there during March. Plate requirements to meet accelerated shipbuilding activity at Gulf ports constitute a major problem for producers and this problem is expected to be intensified by the construction of new shipways and completion of others already started.

Customers of BUFFALO mills continue to order heavily. Mills there report that they are refusing more business than formerly and must continue to do so for a long time. In fact, the only room left on rolling schedules at the district's largest mill is for bars and shapes in the fourth quarter. Furthermore, schedules are too tight to allow squeezing in of small tonnages of any item, even occasionally.

Excepting limited tonnages available only to regular customers, plates and hot rolled sheets are sold out in EASTERN PENNSYLVANIA for the rest of the year. No producers have as yet opened books for the first quarter of 1942, although orders have been taken against the construction of ships scheduled for next year. While heavy bars, being used largely in shell and heavy machinery manufacture, are very tight, in general that market, and structural shapes, carry the best delivery promises.

Prices

. . . Wage rise revives talk of higher quotations

The action of National Steel Corp. in raising wages 10c. per hr. has stirred up discussion as to the future course of steel prices. No definite indication on this is expected until wage negotiations between Carnegie-Illinois and the SWOC are completed. An extension of the deadline to April 15 was agreed upon early this week.

Mr. Weir's position on prices has been repeatedly stated to the effect that higher steel prices would be bad for the country and he is on record as saying that they would not be changed unless raw material costs were unduly advanced. The 10c. per hr. increase, however, if and when followed by the rest of the steel industry, will undoubtedly force some of the smaller companies either to charge premiums or definitely post quotations higher than those of the larger steel companies in case the latter should decide to keep the price level unchanged.

It is estimated that a 10c. per hr. wage increase in steel wages and the higher daily rate for coal miners will mean $2 to $3 higher cost per ton of finished steel.

Iron Ore

. . . First ships arrive with ore at lower lake ports

The first of the 1941 vessel shipments of Lake Superior iron ore was brought down the Great Lakes this week by the Cleveland-Cliffs Iron Co. after a long battle with ice conditions. The steamer *Marquette* loaded at Escanaba on the night of April 4 and the steamer *Joliet* loaded the next morning. Eight other Cleveland - Cliffs freighters reached Marquette, Mich., on April 7-after a five-day battle through ice, and five other ships of the same fleet were headed for Duluth to get ore.

By the end of this week the movement will probably be in full swing. Pittsburgh Steamship Co., (U. S. Steel) largest vessel operator, expects to have all its equipment in commission and other vessel lines were also leaving winter ports.

The goal of the ore industry is to move about 5,000,000 gross tons in April from Lake Superior ports, which means forced draft operations during the remainder of this month.

The Lake movement of ore began without any official announcement of base prices which are usually set early but have been held back this year pending settlement of the steel wage situation. Advances in steel wages are usually

reflected automatically in pay boosts for ore miners whose labor accounts for a large proportion of ore costs, and hence it is possible that the 16 per cent pay boost in the base rate might mean around 20c per ton higher cost on ore.

Steel Operations

. . . Industry rate drops one point, partly because of Ford shutdown

The ingot rate for the industry as a whole is estimated this week at 99 per cent, down a point from last week. The decline is partly accounted for by the shutdown at the Ford steel plant, where a strike has also brought a banking of blast furnaces. The DETROIT district rate has dropped 15 points to 73½ per cent of capacity. There has been a decline of a half point at CHICAGO, one of two points in the YOUNGSTOWN area and one of 3½ points in SOUTHERN OHIO, caused mainly by shutdowns for repairs. Reported increases are four points at BUFFALO and two points at CLEVELAND, but these are not enough to offset the losses.

Pig Iron

. . . Some blast furnaces may be banked because of coal strike

In addition to an Edgar Thomson blast furnace at Carnegie-Illinois' Braddock works, which shut down because of the coke situation, other blast furnaces may be forced to bank by the latter part of this week unless the coal strike is settled immediately. Blast furnaces which might be so affected would be those operating on beehive furnace coke where coal supplies are negligible. The greatest number of blast furnaces in the steel industry, however, are using by-product coke, of which there is adequate supply for some time.

The British Iron & Steel Corp. has issued an inquiry for 150,000 tons of Bessemer pig iron.

At CLEVELAND and YOUNGSTOWN the effect of the coal miners' wage negotiations and the steel pay raise situation occupied the attention of blast furnace operators at the start of this week. The new scrap differentials also held considerable interest and it was thought that possibly the new way of establishing prices of foundry scrap might bring increased buying pressure on pig iron producers from a few sections of the country. Meanwhile, shipments continued at their exceptionally high level and deliveries to the British were going forward.

Coke

. . . OPM surveying beehive field looking to larger output

Surveys to determine how many of 4000 idle beehive coke ovens can be brought into operation have been undertaken by Samuel E. Hackett, chief of the OPM steel unit. His first survey made last week was made to learn the number of additional ovens in the Latrobe, Connellsville and Uniontown, Pa., areas that can be rehabilitated and returned to service. Surveys will be made later in other states. Approximately 10,000 old-style beehive ovens in Pennsylvania, West Virginia, Maryland, Alabama and Colorado have been restored to service and defense officials believe that it may be possible for beehive coke production to reach 9,000,000 tons a year. The OPM said that revival of the beehive industry thus far has been gratifying.

Beehive coke production last month in Pennsylvania totaled 596,100 net tons compared with 496,400 tons in February, according to the U. S. Bureau of Mines. First quarter output totaled 1,606,500 tons compared with 528,700 tons in the first quarter of 1940.

Railroad Buying

. . . Orders placed for 1200 cars, inquiries for 1600

Orders this week total some 1200 freight cars. There were inquiries for 1600.

Rock Island is expected to petition the Federal court for authority to purchase three 2000-hp. diesel-electric locomotives and seven cars for passenger rolling stock. General American Transportation Corp. received an order for 25 covered, 70-ton hoppers from this road.

New York, Chicago & St. Louis bought 500 box cars of 50 tons capacity from American Car & Foundry Co.

Montour has ordered 300 hopper cars from Pullman-Standard Car Mfg. Co.

Nashville, Chattanooga & St. Louis Railway has placed an order with Pullman-Standard for 200 open top hopper cars of 50-ton capacity.

Lake Superior & Ishpeming placed a further order for 100 ore cars with Bethlehem Steel Co. The first order was reported in THE IRON AGE of Feb. 27.

Aliquippa & Southern is building in own shops 50 100-ton mill-type gondolas, and Bethlehem is building 12 100-ton flat cars for use in its plants.

New York Central is expected to order 1000 box cars from the Despatch Shops, Inc.

The following inquiries are recorded: Central of Georgia wants 200 50-ton box cars, Union Pacific 100 cabooses, Missouri Pacific 100 automobile box cars, and Kansas City Southern 200 to 225 freight cars.

St. Louis Southwestern has asked for authority to buy 42 miles of track and accessories, Colorado & Wyoming will take bids on 395 tons of rails and varied accessories, while the War Department is stated to be contemplating the purchase of 10,536 tons of second-hand rails and accessories for training purposes.

From Birmingham it is reported that some railroads are placing orders or making inquiries for 1942 delivery. In anticipation of an increased plate shortage these inquiries are mainly concerned with cars.

Sheets and Strip

. . . Heavy pressure for deliveries by auto makers

Automotive concerns are putting forth more pressure than at any time in their history for shipment of material now on mill order books. Equally as heavy is the pressure for acceptance of tremendous tonnages of flat rolled steel for 1942 models. The use of high speed strip mills for the production of light gage plates destined for shipbuilding programs will have a bearing on flat rolled production and shipment over the next several months.

Automotive purchases at CHICAGO, though lower than a month ago, are still the heaviest single

interest. Farm implement makers are active buyers.

Production last week at principal mills in the CLEVELAND and YOUNGSTOWN area continued at the record pace which prevailed during March. Cold strip mills at CLEVELAND have shown particularly big gains in output recently and hope to sustain the high level as several bullet clip makers are nearing the stage where they will want heavy deliveries.

Production on galvanized sheets has been curtailed by some mills because of shortage of zinc.

The Bureau of Supplies and Accounts, Navy Department, will open bids on April 11 for 2333 tons of black and galvanized sheets for stock at the Norfolk, Va., Navy Yard.

Semi-Finished Steel

. . . Situation very tight despite British hold-up

Pittsburgh reports little or no change in the semi-finished steel situation from a week ago. Current demand continues somewhat in excess of both shipments and production, and even actual orders are still such that backlogs are being added to. A hold-up in billets for Great Britain has only served to schedule this material for national defense projects and commercial requirements.

Semi-finished steel markets at CLEVELAND and YOUNGSTOWN continue to become tighter and tighter, a trend which presents increasing difficulty for non-integrated steel makers and some users of forgings. Producers see no alternative but to serve first their own requirements and at the same time help expedite the defense program.

Wire Products

. . . Volume of new business adds to backlogs

PITTSBURGH wire makers find the volume of new business recently has further added to unfilled tonnage backlog. Rods are in strong demand, manufacturers wire production has reached new high levels, and wire products are receiving substantial seasonal impetus. National defense projects involve substantial tonnages of welded wire and wire mesh for reinforcing purposes.

The high volume sales pace is unslackened at CLEVELAND, preventing reduction of order backlogs. Rod output, while much heavier in recent weeks, often has been hard pressed to keep the wire drawing blocks supplied with proper sizes.

CHICAGO district jobbers have ample stocks for heavy spring demand. Defense and agricultural orders are strong.

Bolts, Nuts and Rivets

. . . Makers await outcome of price and wage situation

Awaiting the outcome of the steel wage negotiations and consequently clarification of second quarter steel prices, a leading bolt and nut manufacturer at CLEVELAND is refraining from making second quarter contracts and is quoting only on current specifications subject to change without notice. The policy is more or less a day-to-day basis.

Merchant Bars

. . . Bookings at an all-time high, orders unabated

Hot rolled bar backlogs at PITTSBURGH are at an all-time high with little or no abatement in the volume of incoming business. Automotive demand is heavy as motor makers attempt to place as much tonnage as possible on mill books for 1942 model requirements. Cold drawers represent a substantial portion of present business owing to the heavy demand for cold finished material.

Deliveries of carbon bars at CHICAGO have been extended one month. Alloy backlogs grow, defense and automotive purchases predominating. Substitution of other alloys for nickel steel alloys has become common practice.

A lull in new shell steel orders has been noted at CLEVELAND recently, but aggregate bookings have not suffered and the dearth is partially offset by additions to old orders. New business for the first five days of April was ahead of the comparable March volume. Production of all principal mills continues at a very high level.

Reinforcing Steel

. . . Awards of 16,100 tons and new projects total 14,300 tons

Reinforcing steel awards of 16,100 tons include 5000 tons at Hermiston, Ore., for an army ordnance depot; 2500 tons for the Consolidated Aircraft plant at San Diego, Cal.; 1600 tons at Detroit for the Hudson Motor Co.'s Naval ordnance plant; 1500 tons at Philadelphia for an addition to the quartermaster's warehouse, and 1200 tons at Wireton, Pa., for the Duquesne Light Co.'s power station.

New reinforcing steel projects call for 14,300 tons. The largest new jobs reported are 2800 tons at Bayonne, N. J., for a large dry dock for the Navy; 1900 tons at South Bend, Ind., for the superstructure of the Studebaker airplane engine plant; 1600 tons at Indianapolis for the Bridgeport Brass Co.'s plant; 1500 tons at Euclid, Ohio, for the Chase Brass & Copper Co.'s plant; 1500 tons for a Navy supply depot at Bayonne, N. J., and 1200 tons for the East River Drive in New York.

Tubular Goods

. . . Several pipe lines ordered . . . Bookings are heavier

Socony Vacuum recently ordered about 270 miles of 6-in. pipe for a gasoline line to run from Topeka, Kan., to Sioux City, Iowa. The order, which will utilize approximately 11,000 tons of steel, was divided among National Tube Co., Jones & Laughlin Steel Corp., and Youngstown Sheet & Tube Co. The Sinclair Refining Co. has ordered approximately 300 miles of 6-in. pipe for a gasoline line to run from Marcus Hook, Pa., to Washington County, Pa. The order, which will require approximately 13,000 tons of steel, was divided among Republic Steel Corp., National Tube Co., Jones & Laughlin Steel Corp. and Youngstown Sheet & Tube Co. The Globe Refining Co. recently ordered about 200 miles of 4-in. pipe involving about 4500 tons of steel, from the Bethlehem Steel Co. for a line to run from McPherson to Council Bluffs, Iowa. Most pipe mills are booked heavily on line pipe business and there is apt to be little inclination to actively solicit new orders.

The only limitations on output of

most Ohio tube mills arise from occasional raw material shortages. New business being received by some tubular departments remains ahead of production.

Pipe tonnage in CHICAGO is heavy and demand is keeping inventories down.

Structural Steel

. . . Awards lighter at 24,700 tons
. . . Inquiries also decline

Fabricated structural steel awards were only 24,700 tons compared with 47,410 tons last week. The largest lettings include 4000 tons at Wireton, Pa., for a power house for the Duquesne Light Co.; 4000 tons for the Bridgeport Brass Co.'s plant at Indianapolis; 4000 tons at Akron, Ohio, for a plant for the Goodyear Tire & Rubber Co.; 3600 tons for hangars at Gravelly Point, Md.; 1350 tons for ramps at Burlington, Iowa, and 1000 tons at San Diego, Cal., for a Navy transit shed.

New structural steel projects of 13,975 tons compare with 31,725 tons a week ago. The only sizable inquiries reported are 3300 tons for grade crossing elimination at Herkimer, N. Y., for the New York Central Railroad, and 1900 tons at West Point, Ky., for the Salt River State bridge.

Plates

. . . Additional heavy tonnages placed with mills

The first week of April has seen additional heavy plate tonnages placed with producers, reports CLEVELAND. At the same time new projects involving many thousand of tons appeared. The plate market beyond all doubt will continue to be the tightest of any in the steel business for a long time to come. Facilities at CLEVELAND, including continuous mills, turned out record tonnages last month. Shearing provides a limitation at one or two of the principal plants.

Several eastern Pennsylvania producers are sold out for the remainder of the year and are booking little but ship tonnage for the first quarter of 1942. Others can accept only limited tonnages for delivery in the third quarter. All district mills are expected to participate in orders to be placed against 84 cargo vessels recently awarded. District railroads are experiencing difficulty in obtaining commitments against extensive new car programs.

Plate users in CHICAGO district are operating shop schedules in step with shipments from steel makers. Railroad carbuilding has been affected in this way.

Shipbuilding

. . . $500,000,000 allocated for ships and shipways

• • • **An allocation** of $500,000,000 for construction of 212 new merchant ships primarily for Great Britain was announced last Friday at the White House. The allocation, made out of the $7,000,000,000 fund appropriated under the lend-lease bill, also contemplates the construction of 56 new shipways in existing plants. Twenty-eight shipways will be built in six of the seven yards which are now engaged in constructing standardized "ugly duckling" ships under the 200-ship program.

Officials estimated that half of the 212 ships will be of the standardized design, with the remainder to follow the Maritime Commission standard C design including an undisclosed number of tankers. Estimates place the probable steel requirements at not less than 650,000 tons.

President Roosevelt announced the rough details of the shipbuilding program in a "necessarily tentative" breakdown of a $1,080,000,000 allocation. Now under study is a $2,000,000,000 allocation for Army, Navy and agricultural goods to be shipped abroad under the lend-lease bill.

It was also announced by the Maritime Commission that 28 more shipways necessary under the enlarged shipbuilding program will be constructed in the emergency yards already contracted for. Expansion in each of the seven emergency yards involved will include an average of three or four shipways per yard.

The commission undertook a survey of existing shipbuilding facilities even before passage of the lend-lease bill they had been advised of the extent of the broadened present program.

If 300 additional ships are awarded, as is the tentative program, about 785,000 tons of steel will be required, mostly plates.

The Maritime Commission has awarded contracts for the construction of 13 emergency cargo ships to the Alabama Dry Dock & Shipbuilding Co., Mobile, Ala. The ships will require about 40,000 tons of steel. The first of the 13 vessels is to be completed within 389 days and the last within 800 days from March 18.

With the contract award to the Alabama Dry Dock & Shipbuilding Co., 175 of the 200 ships in the President's emergency program are under contract. The remaining 25 are to be built at New Orleans by the Louisiana Shipyards, Inc.

In addition to 72 tankers to be built by the Sun Shipbuilding Corp., Chester, Pa., 12 cargo vessels will be constructed.

The Navy Department announced on Monday that it had entered into a contract with the Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash., for the construction of five gasoline tankers at its plant at Tacoma, on a cost-plus-a-fixed-fee basis, the estimated cost per vessel, exclusive of the fixed fee per vessel of $120,000 payable to the contractor, being $2,000,000.

Tin Plate

. . . Australia buying here . . . Domestic demand gains

A continuation of strong export demand, notably from Australia, a steady growth in seasonal domestic requirements, and a step-up in general line can requirements, indicate high tin plate operations for some time to come. Cold reduction mills are estimated to be operating this week at 98 per cent, unchanged from a week ago.

Chicago mills report increasing export demand, are operating at capacity, and orders are slightly ahead of shipments.

Some tin plate mills, having allocated to regular customers all of the tin plate they will be able to produce this year, are out of the market so far as any other business is concerned.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Demand Above Capacity

Cincinnati

• • • **March sales** of machinery in the southern Ohio district are about on par with those of February, although a number of manufacturers indicate a slight slowing up of business during the past month. Despite this, demand still continues to exceed factory capacities and some builders are now quoting 1942 deliveries. Anxiety over the possibility of the new Wright Aeronautical plant raiding machine tool plant forces seems to be diminishing, although, of course, the real test will not come until the plant has been completed. Employment of men for this new factory ultimately expected to reach 15,000 men, has been proceeding quietly. Training schedules for green help have been under way for some months. Machinery executives generally continue to exert all efforts to increase production.

Production At New Peak

Cleveland

• • • **Production of machine tools** here at the leading plants reached a new peak last month but despite this, backlogs have not been lowered to any great extent. Output at one plant making automatics is estimated to be 400 per cent over what it was a year ago.

Goodyear at Akron has been active in the machine tool market recently, purchasing for the new aircraft parts plant which it plans to erect. With Firestone also seeking equipment, the Akron picture has been exceptionally bright. A new batch of inquiries has come out from Cleveland Pneumatic Tool Co., here, maker of aircraft landing gear, and judging from the amounts involved, the equipment evidently represents a project which is more than just a supplement to the big purchases recently completed by this company.

The used machinery market here continues to be tight and, in the opinion of some authorities, operating under a definite handicap. The maximum prices are so widely known that plants wishing to dispose of old equipment are inclined to insist upon getting the ceiling price before parting with it. This provides a restriction upon the dealer who obviously cannot pay the maximum price and sell the machine for the same figure. Under the present costs of reconditioning even the extra percentage allowed is none too large.

Government Buying Seen

New York

• • • **The volume of inquiries** has increased in recent weeks, particularly from government arsenals and Navy yards. Fresh buying is also indicated on the part of the Pratt & Whitney division of United Aircraft, which is about to launch a new expansion program. Meanwhile, the volume of orders actually written continues to exceed current shipments. Deliveries are very spotty. One radial drill maker is quoting July delivery, while competitors' quotations range from October to November. Many items are quoted for delivery past the end of the year.

Elsewhere in this issue a breakdown of machine tool exports for February indicates that shipments to Great Britain fell almost in half from the January total of $16,903,000. One explanation is that an increasingly large amount of equipment bought by the British Purchasing Commission is being shipped to domestic firms which have received large British contracts for ordnance items.

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C-F Positioners are available in four sizes, 1200, 2500, 6000, and 14000 lb. capacities.

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Tilting and rotating movements of table are independently controlled on both power and hand-operated machines.

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Table is removable for special fixtures if desired.

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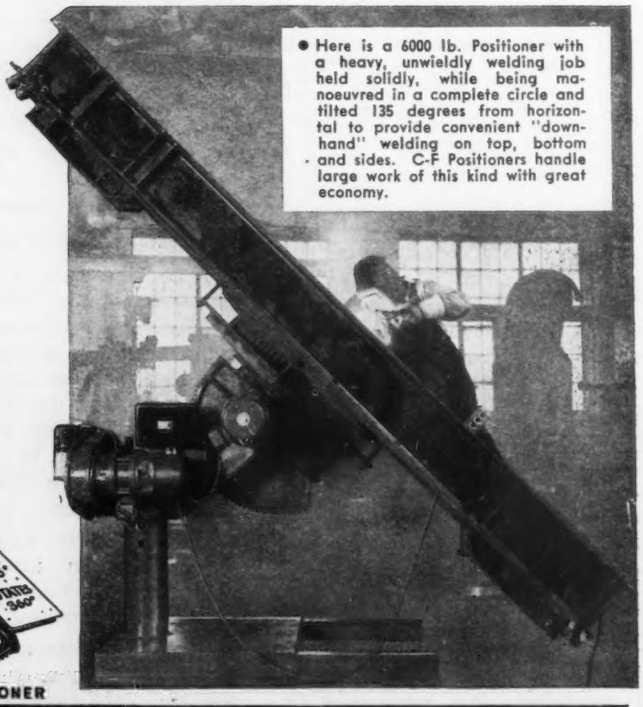
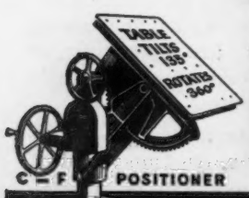
Write today for complete information about C-F Welding Positioners which provide the economical means of quick, safe and easy welding.



• Here is a 6000 lb. Positioner with a heavy, unwieldly welding job held solidly, while being manoeuvred in a complete circle and tilted 135 degrees from horizontal to provide convenient "down-hand" welding on top, bottom and sides. C-F Positioners handle large work of this kind with great economy.



CULLEN-FRIESTEDT CO.,
1303 S. KILBOURN AVE. CHICAGO, ILLINOIS

Non-Ferrous Metals
. . . MARKET ACTIVITIES AND PRICE TRENDS

New York

• • • **The probability** of more extensive price controls for non-ferrous metals is receiving the attention of all major non-ferrous markets. In addition to the meeting to be held with manufacturers and scrap interests this week, looking toward the establishment of maximum prices on brass ingots and scrap, another has been called with members of the copper industry for the purpose of fixing ceiling prices on all grades of primary and secondary copper, based on the current price of 12c. a lb. for electrolytic copper. Meanwhile, the Price Stabilization Division requested leading lead producers to refrain from further price increases. Nothing has been announced as yet with regard to tin prices but it is believed that the official agency may be interested in lower prices in that market.

Largest proportion of the copper tonnages allocated by mine producers in the past week was for July delivery, although a substantial amount was scheduled for April, with smaller lots scattered in between. Inquiry in the custom smelter market was rather light with prices unchanged at 12.50c. Transactions were very light in the export market, quoted at 12c., f.a.s.

Zinc

Stocks of slab zinc were down only 117 tons to 6969 tons at the end of March, as compared with 7086 tons in February, according to trade statistics appearing this week. The rate of decline was off sharply from that of recent months and reflected a 12 per cent increase in production. Output in March totaled 63,366 tons, as against 56,334 tons in February. Shipments were up 7 per cent to 63,483 tons from 59,220 in the preceding month. In the regular market there were heavier transactions. Sales rose to 6341 tons from 3302 in the previous week, while shipments totaled 6170 tons, as compared with 5368 tons two weeks ago. Backlogs were decreased only slightly to 94,191 tons.

Lead

Apparently reassured that there would be no further advances in the near future, consumers eased their pressure on sellers immediately following the announcement of official requests with regard to prices. Up until that time sellers had committed themselves liberally on a heavy demand, sales for the week being the largest in many months. One producer is sold out for April and May with the exception of routine business to be booked for regular customers. For the industry as a whole May has been 50 per cent sold, while April is fully accounted for. Prices are unchanged from a week ago at 5.85c. a lb., delivered New York.

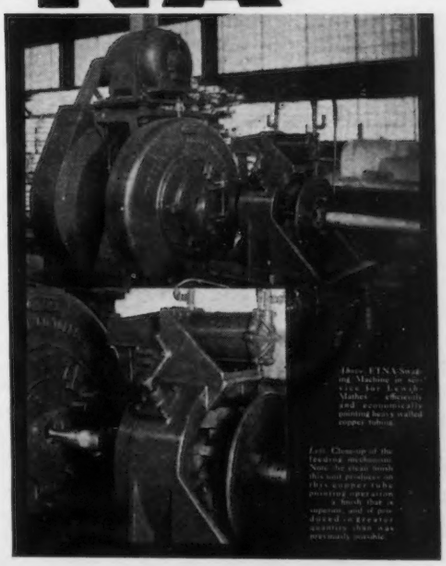
Tin

Sales in the Far East have been small since the beginning of the present month and prices here have remained firm. Although arrivals here have been heavy recently, the supply of tin available for nearby delivery remains limited, since most of that coming to this country has already been contracted for. Prompt Straits metal today is quoted at 51.75c. a lb., delivered New York, unchanged from a week ago, although the price varied throughout the week. Reports that maximum prices may be fixed for tin as they have been for other non-ferrous metals are as yet unconfirmed.

(Non-ferrous prices on page 139)

LEWIN-MATHES *Got the right answer at*

ETNA



They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

An almost complete stoppage of scrap trading followed the announcement from Washington late last week of fixed prices. The scrap trade is in a quandary as to what prices it can charge for grades commonly traded in for which no prices were announced. In view of this situation THE IRON AGE is unable to publish quotations this week on a considerable number of items for which there has been an unbroken record of quotations over many years. This is true of many of the railroad specialties and it is also true of cast grades.

Although steel plants for the most part are benefited by the price schedule, in which maximum quotations for steel grades are generally lower than those which have recently prevailed, foundries are in many instances severely penalized by the provision which sets prices for cast scrap at differentials under the delivered price of No. 2 pig iron. Foundries which are at some distance from blast furnaces and which therefore have a high freight rate must in innumerable cases pay more for cast scrap than they have recently paid if the maximum prices are charged. The history of price fixing is that the maximum also becomes the minimum.

The Bethlehem Steel Co., however, has established differentials of 50c. a ton under the eastern Pennsylvania maximum for steel scrap at Sparrows Point and Bethlehem in order not to penalize other mills in that area. It is considering similar action on the Pacific Coast with respect to Los Angeles and Seattle.

The most severe criticism of the price schedule relates to the clause that all contracts must be completed by April 10. The scrap trade is asking for an extension of 30 to 60 days. Steel companies will generally adhere to the contracts they have made.

THE IRON AGE scrap composite is lowered to $19.17 from $20.25 last week.

Pittsburgh

The market here remains unclarified and confused, especially on those grades not covered in the government setup of fixed prices. Activity in scrap grades not mentioned in the government ceiling quotations is practically at a standstill and some quotations this week are marked "nominal" because of lack of definite information. Practically no transactions have taken place on any scrap grades as brokers are feverishly attempting to ship old business as they await some kind of an extension in the time limit set for delivery of old material.

Chicago

Long-awaited scrap differentials have brought both quiet and disturbance to the market here. Broadly speaking, dealers, brokers and consumers are in agreement that prices set are fair. While there is a unanimous desire to cooperate with prices issued so far, the disturbance in the market has arisen over indecision on many items not covered in published differentials. Reaction has been that no transactions whatever on such "orphans" took place following official announcement and little is likely to occur until the situation is clarified. Because of confusion in the trade concerning many "angles" of the announcement, there is a distinct unwillingness to take any action whatsoever except that which is clearly prescribed so far by the government. Numerous questions have arisen regarding the plight of consumers off main railroad lines, regarding the fate of those contracts entered into before April 3, regarding commissions and discounts and a host of other posers. Chicago brokers have sought an extension of time on contracts previously signed, for considerable losses and greater confusion would result if more time is not granted. Consumers seem to agree on this point. Prices on items not covered in official lists are omitted since there were no transactions on such products.

Philadelphia

Although the fixed prices in Eastern Pennsylvania are $18.75 for No. 1 heavy melting steel and $17.75 for No. 2 steel, the Bethlehem Steel Co. has decided to offer only $18.25 and $17.25 for these grades for Bethlehem, Pa., and Sparrows Point, Md., delivery in order not to penalize other mills in the eastern Pennsylvania district. The maximum government prices will be offered for Steelton. The Eastern Pennsylvania scrap market has been more or less at a standstill since the government prices were announced. Much confusion remains to be cleared up, especially in regard to cast scrap, of which this district uses large quantities. In addition, traders are concerned over the limited time allowed to complete old contracts. If smaller dealers should delay in making deliveries on present contracts it would be impossible for yards to prepare scrap and ship it to consumers within the time allotted.

Cleveland

Announcement of the new scrap differentials plunged the local market into confusion which at the start of this week seemed to be getting worse instead of better. Awaiting differentials on some 50 items not mentioned on the first announcement, the New York Central list had been postponed indefinitely. The new cast iron scrap situation aroused a furore. Foundry interests assert Southeastern scrap will never come here any more, to the detriment of the defense program. The one week deadline on shipments has aroused universal complaint and it is said not half of the scrap on order here could be delivered from Arizona, Duluth and other points before April 10. Dealers and steel companies fear they will be liable to legal action. As near as can be ascertained, no sales on the basis of the new schedule have yet been made here.

St. Louis

Because of the confusion existing in the scrap iron market in St. Louis, no sales were made during the week, as dealers and mills were unwilling to trade. Shipments from the country continue at a lively rate.

Birmingham

Confusion and uncertainty mark this district following last week's scrap differential announcement. Only prices now existent, pending clarification of the differential order as it affects this market, are prices on items listed by the division and these prices are the maximums set by the division. New purchases by dealers have been at a standstill and practically all shipments are being made against old orders in the hope of making delivery on these orders by the April 10 deadline.

Detroit

Detroit markets were inactive while clarification and interpretation of the new government prices on iron and steel were sought. Only sale pending in the early part of the week was the disposal of scrap listed by Hudson Motor Car Co. This included 50 cars of bundles. It was pointed out that Hudson, along with many other plants, is so located that a "double switch," or "double rail handling," is necessary to move material to the Great Lakes Steel plant, principal consumer. However, if the purchaser of the scrap chose to move it by water, a single switch, or handling by rail, is all that would be required to get it to the docks. This sort of problem is typical of those arising as the trade attempts to apply the flat prices in practice. Objections were multitudinous, including the differentiation and discrimination against dealer bundles as compared with hydraulic bundles, since some dealers in this area maintain that their prepared bundles have been acceptable in the past as the equivalent of factory prepared bundles.

Scrap Prices

Gross Ton

	Delivered to Consumer at:													Dealers buying prices f.o.b. cars:		
	Pittsburgh	Eastern Pennsylvania	Chicago	Youngstown	Cleveland	Southern Ohio	Buffalo	Birmingham	Detroit	St. Louis	New England	Duluth	Pacific Coast	New York*	Toronto	Export N. Y.
No. 1 Heavy melting steel	20.00	18.75	18.75	20.00	19.50	18.50	19.25	17.00	17.85	17.50	15.50	18.00	14.50	15.25	12.50	15.25 to 16.25
No. 2 Heavy melting steel	19.00	17.75	17.75	19.00	18.50	17.50	18.25	16.00	16.85	16.50	14.50	17.00	13.50	14.25	10.50	14.25 to 15.25
No. 1 Black hydraulic compressed sheets	20.00	18.75	18.75	20.00	19.50	18.50	19.25	17.00	17.85	17.50	15.50	18.00	14.50			
No. 1 Dealers' bundles	19.00	17.75	17.75		18.50	17.50	18.25	16.00	16.85	16.50	14.50	17.00	13.50			
No. 2 Dealers' bundles	18.00	16.75	16.75		17.50	16.50	17.25	15.00	15.85	15.50	13.50	16.00	12.00			
Mixed borings and turnings	15.50	14.25	14.25		15.00	14.00	14.75	12.50	13.35	13.00	9.25	13.50	10.00	10.75	9.50	
Machine shop turnings	15.50	14.25	14.25	15.50	15.00	14.00	14.75	12.50	13.35	13.00	9.40	13.50	10.00	10.75	9.00	
Shoveling turnings	16.50	15.25	15.25		16.00	15.00	15.75	13.50	14.35	14.00		14.50	11.00			
Drop forge flashings							18.25		17.35						10.50	
No. 1 busheling	19.50	18.25	18.25	19.50	19.00	18.00	18.75	16.50	17.35	17.00	15.00	17.50	14.00		7.50	
No. 2 busheling	15.50	14.25	14.25		15.00	14.00	14.75	12.50	13.35	13.00	11.00	13.50	10.00			
Uncut structural and plate scrap	19.00		17.75		18.50	17.50	18.25	16.00	16.85	16.50	14.50	17.00	13.50			
Low phos. billet & bar crops & punchings	25.00	23.75	23.75		24.50	23.50	24.25	22.00	22.85	22.50	20.50	23.00	19.50			
Low phos. heavy plate																
Heavy steel axle turnings																
Heavy steel forge turnings																
RAILROAD GRADES																
No. 1 RR heavy melting steel	21.00	19.75	19.75	21.00	20.50	19.50	20.25	18.00	18.85	18.50	16.50		15.50			
Scrap rails	22.00		20.75		21.50	20.50	21.25	19.00	19.85	19.50	17.50		16.50	17.25		
Scrap rails 3 ft. and under	24.00		22.75		23.50	22.50	22.75	21.00	21.85	21.50	19.50		18.50	19.25		
Scrap rails 2 ft. and under	24.50		23.25		24.00	23.00	23.75	21.50	22.35	22.00	20.00		19.00	19.75		
Scrap rails 18 in. and under	25.00		23.75		24.50	23.50	24.25	22.00	22.85	22.50	20.50		19.50	20.25		
Rerolling rails	23.50		22.25		23.00	22.00	22.75	20.50	21.35	21.00	19.00		18.00	18.75		
RR couplers and knuckles																
Coil and leaf springs										22.00 to 22.50						
Steel wheels																
RR malleable										20.50 to 21.50						
Steel axles										25.50 to 26.00						
Locomotive tires										20.00 to 20.50						
FOUNDRY GRADES																
No. 1 cupola		23.00 to 24.50	22.60		22.50		22.00 to 22.50	18.00	22.50					21.00	20.00	
Heavy breakable cast		21.50 to 23.00	21.10		20.50		20.50		21.00		18.25			18.80	18.00	
Stove plate		Nom.	17.60		17.50		17.00	13.00	17.50		14.50			17.50	16.00	17.50
Cast iron car wheels																
Grate bars										14.50 to 15.00						
Cast iron borings	15.50	14.25	14.25		15.00	14.00	14.75	12.50	13.35	13.00	11.00	13.50	10.00	10.75	9.00	
Cast iron borings (chem.)																
Unprepared yard scrap														10.50		

* For delivery to Eastern Pennsylvania consumers

More Changes Are Announced by OPM

Washington

• • • **Because of the** number of problems which have arisen in the minerals and metals field, OPM Director of Priorities E. R. Stettinius, Jr., has announced the establishing of a Ferrous Minerals and Alloys branch in connection with several organizational changes within the Priorities Division, as well as the addition of key personnel to the staff.

Arthur D. Whiteside, of Dun & Bradstreet, has been made chairman of the Iron and Steel Priority Committee and of the new Ferrous Minerals and Alloys Committee.

The Minerals and Metals group now has four branches, the new one supplementing one each for iron and steel; non-ferrous metals; and aluminum and magnesium. Priority committees have been functioning in these fields and will continue.

The new Ferrous Minerals and Alloys Branch will handle problems concerning iron ore, iron and steel scrap, chrome, manganese, tungsten, vanadium, molybdenum, nickel and the ferro-alloys. D. A. Uebelacker, an engineer, of Ford, Bacon and Davis, Inc., New York, will serve as staff expert.

New personnel added to the staff recently includes:

L. E. Scriven, managing director of the British subsidiary of the A. C. Nielsen Co., Chicago, and vice-president of the parent company, who will serve as deputy assistant director of the priorities division, in charge of liaison with other government departments and foreign government.

E. A. Locke, Jr., of the Chase National Bank, New York, who will work in close association with Mr. Scriven as principal liaison officer of the liaison unit.

Geoffrey S. Smith, OPM Assistant General Counsel, has been assigned as head of the legal staff of the Priorities Division.

L. K. Straus, sales manager of the New York branch of the Shaw-Walker Co., will serve as secretary of the division, succeeding Dr. W. S. A. Pott, who has had to return to his post as president of Elmira College.

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings dropped to 27,400 tons from 47,410 tons last week; new projects lower at 13,975 tons against 31,725 tons a week ago; plate awards only 780 tons.

AWARDS

NORTH ATLANTIC STATES

4000 Tons, Wireton, Pa., power house for Duquesne Light Co., to Bethlehem Steel Co., Bethlehem, Pa.

3600 Tons, Gravelly Point, Md., hangar, to Bethlehem Steel Co., Bethlehem, Pa.

820 Tons, Jamaica, N. Y., sewage treatment project contract 10, to American Bridge Co., Pittsburgh.

815 Tons, Bristol, Pa., aircraft parts assembly plant for Fleetwings, Inc., to Belmont Iron Works, Philadelphia.

615 Tons, Lebanon County, Pa., highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

500 Tons, Buffalo, grain storage plant for G.L.F. Mills, Inc., to Bethlehem Steel Co., Buffalo, through James Stewart Co., Chicago, general contractor.

450 Tons, New York, apartment house for L. Victor Weil, to American Bridge Co., Pittsburgh.

425 Tons, York, Pa., York Safe & Lock Co. expansion to Bethlehem Steel Co., Bethlehem, Pa.

315 Tons, Staten Island, N. Y., building No. 127, Bethlehem Shipbuilding plant, to Schacht Steel Construction Co., New York.

205 Tons, Bridgeport, Conn., Y.W.C.A. building, to an unnamed bidder.

150 Tons, Cheektowaga Township, N. Y., oil house and garage for Curtiss Aeroplane Division, Curtiss-Wright Corp., to R. S. McMannus Steel Construction Co., Buffalo.

145 Tons, New York, R.O.T.C. drill hall, to American Bridge Co., Pittsburgh.

140 Tons, Madison, N. J., State grade crossing elimination, to American Bridge Co., Pittsburgh.

135 Tons, North Tonawanda, N. Y., storage racks for Buffalo Bolt Co., to Buffalo Structural Steel Co., Buffalo.

100 Tons, Niagara Falls, N. Y., addition for R. & H. Chemical Division, E. I. du Pont de Nemours, Inc., to Ernst Iron Works, Buffalo.

100 Tons, Springfield, Mass., bridge for Army department, to Haarman Steel Co., Holyoke, Mass.

THE SOUTH

590 Tons, Emco, Ala., addition, Electro Metallurgical Co., to Southern Steel Works Co., Birmingham.

CENTRAL STATES

4000 Tons, Indianapolis, Bridgeport Brass Co. plant, to American Bridge Co., Pittsburgh; Stone & Webster Co., contractor.

4000 Tons, Akron, plant for Goodyear Tire & Rubber Co., to R. C. Mahon Co., Detroit.

1350 Tons, Burlington, Iowa, ramps, to Illinois Steel Bridge Co., Jacksonville, Ill.

600 Tons, Chicago, 63d Street station, to Hansell-Elcock Co., Chicago.

400 Tons, Janesville, Wis., State bridge FAP-450-C, to American Bridge Co., Pittsburgh.

400 Tons, Cleveland, building for Steel & Tubes Division, Republic Steel Corp., to Truscon Steel Co., Youngstown.

300 Tons, Plainville, Ind., State bridge, to Elkhart Iron & Steel Co., Elkhart, Ind.

220 Tons, Frankenmuth, Mich., State bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

215 Tons, South Haven, Mich., State bridge, to R. C. Mahon Co., Detroit.

210 Tons, Cincinnati, boiler plant for Cincinnati Milling Machine Co., to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, Hoovers, Ind., rebuilding bridge No. 1696 for Chesapeake & Ohio Railway Co., to American Bridge Co., Pittsburgh.

200 Tons, Kingsbury, Ind., column bases and door frames, ordnance plant, to Mississippi Valley Structural Steel Co., Decatur, Ill.

165 Tons, Galion, Ohio, expansion of Galion Metallic Vault Co., to C. E. Morris, Columbus.

100 Tons, Cincinnati, shop for Carlton Machine Tool Co., to Jones & Laughlin Steel Corp., Pittsburgh.

WESTERN STATES

1000 Tons, San Diego, Cal., Navy transit shed, to National Iron Works, San Diego, through Mojave Corp., Los Nietos, Cal., and Person & Hollingsworth, Los Angeles, contractors.

525 Tons, Estes Park, Colo., tunnel supports, Continental Divide Tunnel (Specification 950), to Colorado Fuel & Iron Corp., Denver, through S. S. Magoffin Co., Inc., Englewood, Colo., contractor.

275 Tons, Vernon, Cal., Poulsen & Nardon factory, to Union Iron & Steel Co., Los Angeles.

116 Tons, Clifton, Ariz., Rattlesnake Canyon highway bridge, to Allison Steel Mfg. Co., Phoenix, Ariz.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

3300 Tons, Herkimer, N. Y., New York Central Railroad grade crossing, project PSC 5937; bids April 23.

2500 Tons, Allegheny County, Pa., State highway bridge LR-187, Dinardo, Inc., Pittsburgh, general contractor.

525 Tons, Middletown, Pa., Government warehouse, units Nos. 6, 7 and 8.

500 Tons, New York, grade crossing elimination CB-41-1.

475 Tons, Edgewood Arsenal, Md., production machine shop for War Department.

475 Tons, Chautauqua County, N. Y., grade crossing elimination; bids April 23.

350 Tons, Philadelphia, poles, extensions, and beams for Philadelphia Electric Co.

350 Tons, Buffalo, Miller Avenue grade crossing; Bouley Co., Auburn, N. Y., general contractor.

250 Tons, North Tonawanda, N. Y., warehouse for Buffalo Bolt Co.; bids taken.

210 Tons, New York, maintenance platform, Williamsburg bridge.

200 Tons, Niagara Falls, N. Y., building for Great Lakes Carbon Co.

185 Tons, Athens, Pa., machine shop addition for Ingersoll-Rand Co.

175 Tons, Washington County, Pa., state highway overpass LR-181; Hineman Brothers, Pittsburgh, general contractors.

130 Tons, Elmira, N. Y., building addition for Bendix Aviation Corp., Eclipse Machine Division.

120 Tons, Butler, Pa., store No. 92 for G. C. Murphy Co.

110 Tons, Pittsfield, Mass., jib cranes for General Electric Co.

100 Tons, Buffalo, Curtis Screw Co., Inc., plant addition; bids in.

THE SOUTH

1900 Tons, West Point, Ky., Salt River State bridge.

340 Tons, Parsons, W. Va., State bridge.

225 Tons, Norfolk, Va., Falling Creek bridge for Seaboard Air Line Railway.

140 Tons, Morgantown, W. Va., women's dormitory, West Virginia University.

CENTRAL STATES

800 Tons, Columbus, Ohio, storage sheds for Government.

674 Tons, State of Illinois, three highway bridges; bids April 11.

420 Tons, Trumbull County, Ohio, Mahoning River State bridge.

335 Tons, State of Missouri, five highway bridges; bids April 10.

165 Tons, Zoarville, Ohio, Tuscarawas River, State bridge.

WESTERN STATES

651 Tons, Lincoln County, Mont., Kootenai River bridge, Public Roads Administration; bids April 16.

550 Tons, Coram, Cal., bulkhead gates, Shasta Dam, Specification 1500-D, for Bureau of Reclamation.

200 Tons, Military Junction, Colo., bridge, Invitation No. 9848 for Government.

172 Tons, Los Angeles, Higuera Street bridge over Ballona Creek; bids April 22.

100 Tons, Los Angeles, North Figueroa Street bridge; bids April 24.

BRITISH WEST INDIES

600 Tons, Trinidad, Navy Department airplane hangars; James Stewart & Co., New York, contractors.

Weekly Bookings of Construction Steel

Week Ended →	Apr. 8, 1941	Apr. 1, 1941	Mar. 11, 1941	Apr. 9, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	27,400	47,410	35,570	5,450	451,085	209,760
Fabricated plate awards	780	16,150	5,100	3,870	49,785	43,990
Steel sheet piling awards	0	7,435	475	420	12,880	10,490
Reinforcing bar awards	16,100	14,960	10,200	13,200	168,800	118,870
Total Letting of Construction Steel	44,280	85,955	51,525	22,940	682,550	383,110

FABRICATED PLATES

AWARDS

369 Tons, San Antonio, Tex., Fort Sam Houston, tank and tower, to Chicago Bridge & Iron Co., Chicago.

210 Tons, Redding, Cal., floor plates for Pit River bridge (Invitation A-33,172-A), to Alan Wood Steel Co., Conshohocken, Pa.

200 Tons, Oleum, Cal., smoke stack and tank, to Western Pipe & Steel Co., San Francisco.

PENDING PROJECTS

1000 Tons, San Diego, Navy dry dock; Pacific Bridge Co., San Francisco, contractor.

200 Tons, Hawaii, tank.

125 Tons, Petaluma, Cal., oil tank.

Reinforcing Steel

Awards of 16,100 tons; 14,300 tons in new projects.

AWARDS

ATLANTIC STATES

1500 Tons, Philadelphia, addition to warehouse, Quartermaster's Department, to Bethlehem Steel Co., Bethlehem, Pa.

1200 Tons, Wireton, Pa., Duquesne Light Co. power station, to Jones & Laughlin Steel Corp., Pittsburgh.

490 Tons, Hartford, Conn., bridge, to Truscon Steel Co., Youngstown, through Mariani Construction Co., New Haven, Conn.

430 Tons, McKeesport, Pa., G. C. Murphy Co. warehouse, to Bethlehem Steel Co., Bethlehem, Pa., through Dick Construction Co., contractor.

200 Tons, Worcester, Mass., Worcester Polytechnic building to a local bidder.

200 Tons, Luzerne County, Pa., road, to Bethlehem Steel Co., Bethlehem, Pa., through Weldon Construction Co., Westfield, N. J.

185 Tons, Cumberland County, Pa., to Bethlehem Steel Co., Bethlehem, Pa., through Hempt Brothers, Harrisburg, general contractors.

150 Tons, Washington, McInerny apartment building, to Bethlehem Steel Co., Bethlehem, Pa., through Hudson Supply & Equipment Co.

100 Tons, East Hartford, Conn., Coca Cola plant, to an unnamed bidder.

SOUTH AND CENTRAL

1600 Tons, Detroit, Hudson Motor naval ordnance plant, to Bethlehem Steel Co., Bethlehem; Bryant & Detwiler, contractor.

320 Tons, Flint, Mich., Buick storage and drive-a-way building, to Jones & Laughlin Steel Corp., Pittsburgh; through Taylor-Gaskin Co.; Darin & Armstrong, contractor.

314 Tons, Pascagoula, Miss., ship ways for Ingalls Shipbuilding Corp., to Truscon Steel Co., Youngstown.

300 Tons, Philo, Ohio, Ohio Power Co. plant, to Truscon Steel Co., Youngstown.

220 Tons, Beaumont, Tex., waterworks, to Truscon Steel Co., Youngstown, through O. W. Collins.

200 Tons, Hammond, Ind., Sisters of Mercy Hospital, to Olney J. Dean Steel Co., Chicago.

171 Tons, New Orleans, Hotel Dieu nurses' building, to Truscon Steel Co., Youngstown, through George Glover.

160 Tons, Newport News, Va., Riverside Hospital addition, to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co.

137 Tons, Tucumcari, N. M., Tucumcari project (Invitation 32,988-A), to Capitol Steel & Iron Co., Oklahoma City.

130 Tons, Kansas City, Kan., three pumping stations, Fairfax-Jersey Creek, to Sheffield Steel Corp., Kansas City, Mo.

100 Tons, Irish Bend Island, Tex., Rust Engineering Co. project, to Truscon Steel Co., Youngstown.

100 Tons, New Orleans, Florida Avenue wharf, to an unnamed bidder.

WESTERN STATES

5000 Tons, Hermiston, Ore., Army ordnance depot, to Bethlehem Steel Co., Portland, Ore., through J. A. Terteling & Son, Boise, Idaho, contractor.

2500 Tons, San Diego, Cal., Consolidated Aircraft plant, to Truson Steel Co., Youngstown, through Defense Plant Corp.

146 Tons, Bakersfield, Cal., Kern River bridges, to Ceco Steel Products Co., Los Angeles, through Fred Fredenburg, South San Francisco, contractor.

130 Tons, Odair, Wash., Columbia Basin project (Invitation C-38,251-A), to Bethlehem Steel Co., San Francisco.

100 Tons, Concord, Cal., Central Valley project (Invitation 49,213), to Bethlehem Steel Co., San Francisco.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

2800 Tons, Bayonne, N. J., Navy superdrydock; George H. Flinn and Great Lakes Drydock Co.

1500 Tons, Bayonne, N. J., Navy supply depot; Mahoney Troast & Wighton Abbott Co., contractor.

1200 Tons, New York, East River Drive; Lynn Construction Co., New York, low bidder on general contract.

797 Tons, Astoria, N. Y., grade elimination, contract CH-41-1; bids due April 10.

250 Tons, Brooklyn, Navy Yard medical supply storehouse; W. J. Barney Corp., contractor.

230 Tons, Herkimer County, N. Y., grade crossing elimination; bids April 23.

220 Tons, New York, runways and painting platforms for Williamsburg Bridge; Fichter Steel Corp., New York, low bidder.

100 Tons, Springfield, Mass., Coca Cola Bottling Co. plant.

SOUTH AND CENTRAL

1900 Tons, South Bend, Ind., superstructure, Studebaker airplane engine manufacturing plant; bids in.

1600 Tons, Indianapolis, Bridgeport Brass Co. rolling mill; Stone & Webster, contractor.

1500 Tons, Euclid, Ohio, Chase Brass & Copper Co. shell manufacturing plant; Stone & Webster, contractor.

570 Tons, Chicago, superstructure, Studebaker plane engine parts plant; bids due April 11.

355 Tons, Waveland, Ark., Blue Mountain Dam; bids U. S. Engineer's Office, Little Rock, Ark., April 26.

350 Tons, Chicago, General Electric Co., Victor X-Ray division plant; James Stewart, contractor.

350 Tons, Chicago, Buick aircraft engine plant, dynamometer test building, personnel building, boiler house; bids April 11.

220 Tons, Fort Wayne, Ind., superstructure Studebaker airplane engine gear plant; bids in.

WESTERN STATES

198 Tons, Napa, Cal., State hospital tubercular unit; bids in.

126 Tons, Lincoln County, Mont., Kootenai River bridge, Public Roads Administration; bids April 16.

Pipe Lines

El Paso Natural Gas Co., El Paso, Tex., has approved plans for new 10¾-in. welded steel pipe line from Douglas, Ariz., to Phoenix, Ariz., about 85 miles, for natural gas transmission. New line will pass through Pima, Cochise, Pinal and Maricopa Counties. Cost about $750,000 with booster stations and other operating facilities.

White Eagle Oil Division, Socony-Vacuum Oil Co., Inc., Federal Reserve Bank Building, Kansas City, Mo., plans new 6-in. welded steel pipe line from connection with present main system at Topeka, Kan., to Omaha, Neb., with branch line to Sioux City, Iowa, about 250 miles in all, for gasoline transmission. Lines will connect with bulk river terminals at points noted and will form an extension of present Augusta-Topeka-Kansas City pipe line, used for similar service. Work is scheduled to begin soon. Cost over $2,000,000 with booster stations and terminal facilities.

Quartermaster, Fitzsimmons General Hospital, Denver, asks bids until April 16 for about 23,000 ft. of black wrought steel pipe (Circular 308-55).

Gulf Oil Corp., Gulf Building, Houston, Tex., has authorized immediate construction by company forces of new 6-in. welded joint, cast iron pressure pipe line from recycling plant in Opelika oil field, Henderson County, Tex., to Big Sandy, Tex., about 40 miles, where connection will be made with main pumping station of company. New line will be used for oil transmission, with rating of about 6000-bbl. per day. Cost close to $100,000.

Sinclair Refining Co., Marcus Hook, Pa., and 630 Fifth Avenue, New York, plans welded steel pipe line from oil refinery at Marcus Hook to point on Pennsylvania-Ohio State line, near Washington, Pa., with branch line to Pittsburgh, about 360 miles, for gasoline transmission. Company is organizing Union Pipe Line Co., a subsidiary, to carry out project.

South Penn Oil Co., South Penn Building, Bradford, Pa., plans pressure pipe lines in connection with development of crude oil properties in Harmony Township, Forest County, where new wells will be drilled on a 1000-acre tract. Entire project will cost over $100,000.

Arcata, Cal., has awarded 125 tons of 12-gage pipe to California Corrugated Culvert Co., Berkeley, Cal.

Cast Iron Pipe

Massachusetts, Metropolitan Water Division, will take bids until April 17 on 263 tons of pit cast cement lined bell and spigot pipe, 120 tons of regular pipe, 21 tons of special castings, and 138 tons of cement lined castings.

Worcester, Mass., is in the market for about 26,000 ft. of pipe, delivery at Albany Street yard.

Agency, Iowa, plans about six miles of 6-in. pipe for connection with water system at Ottumwa, Iowa, to be used as local supply source; also for elevated steel tank and tower. Cost about $55,000.

Lorimor, Iowa, plans pipe lines for water system and other waterworks installation. Cost about $30,000. Financing will be arranged through Federal aid.

Water Department, Toledo, Ohio, plans new 8-in. pipe in Woodruff Avenue, from Canton Street to Scottwood Avenue, and 6-in. from Monroe Street to Clinton Street, for extensions in water system.

Independence Waterworks Co., Independence, Mo., is making surveys and plans for extensions in main water line to Lake City, for supply for new Federal munition works at that place, requiring about 44,000 ft. of 14-in. pipe with fittings, valves, etc. Cost close to $200,000.

Litchfield, Mich., plans water pipe line system and other waterworks installation, including pumping station, hydrants and other facilities. Cost about $73,000, of which $30,000 will be a bond issue, recently voted, and remainder of fund secured through Federal aid.

Water Department, Mansfield, Ohio, plans extensions in main lines for service in industrial district. Cost about $25,000. Financing has been arranged through Federal aid and work is scheduled to begin in May.

Glendale, Ariz., plans extensions in water pipe line system, including new 200,000-gal. elevated steel tank and tower. Special election has been called April 14 to approve bond issue of $78,000 for this and extensions and improvements in sewage system.

Barnard, Kan., will begin work soon on pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Cost about $52,000. Financing has been arranged through Federal aid. Paulette & Wilson, Public Utilities Building, Salina, Kan., are consulting engineers.

Salida, Colo., will install about 14,170 ft. of 12, 8, 6 and 4-in. pipe for extensions in water system. Cost about $53,000. Financing has been arranged through Federal aid.

Neillsville, Wis., has engaged Mead, Ward & Hunt, State Journal Building, Madison, Wis., consulting engineers, to make surveys and estimates of cost for pipe lines for water system and waterworks station.

Board of Public Works, Columbus, Ind., plans pipe line extensions and replacements in water system, and other waterworks installation. Cost close to $400,000. Russell B. Moore & Co., Indiana Pythian Building, Indianapolis, are consulting engineers.

Centerville, Iowa, plans about 7950 ft. of 8-in. pipe, 2320 ft. of 6-in., and 670 ft. of 4-in. for extensions and improvements in water system, and other waterworks installation. Cost close to $27,400.

United States Engineer, Los Angeles, will take bids April 11 for construction of sewer, water and gas systems at Phoenix Military Airport, Phoenix, Ariz., involving substantial quantities of cast iron and steel pipe.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG. Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	68
9/16 and ⅝ in. by 6 in. and shorter	66
¾ to 1 in. by 6 in. and shorter	64
1⅛ in. and larger, all lengths	62
All diameters over 6 in. long	62
Lag, all sizes	65
Plow bolts	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	66
9/16 to 1 in. inclusive	63
1⅛ to 1½ in. inclusive	61
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	66	70
9/16 to 1 in.	63	65
1⅛ in. through 1½ in.	61	62
1⅝ in. and larger	60	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	73 and 100
Stove bolts in packages, with nuts attached	73
Stove bolts in bulk	81

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	68
Upset set screws, cup and oval points	74
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Apr. 2	Apr. 3	Apr. 4	Apr. 5	Apr. 7	Apr. 8
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York[2]	51.50	51.625	51.75	....	51.875	51.75
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.70	5.70	5.70	5.70	5.70	5.70

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	52.75	55.00
Copper		
Electro	13.00	14.50
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	9.10
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.75	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy crucible	10.375	11.00
Hvy. and wire	9,375	9.775
Light and bottoms	8.375	8.875
Brass		
Heavy	6.125	6.625
Light	5.125	5.875
No. 1 yel. turn	5.875	6.375
No. 1 red or compo. turnings	9.125	10.125
Hvy. Mach. compo.	9.50	9.725
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00-12.00	
Sheet	12.00-13.50	
Zinc	5.10	

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $184, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem . . . $54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade . . . . . 2.70c.
Delivered, Detroit . . . . . 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

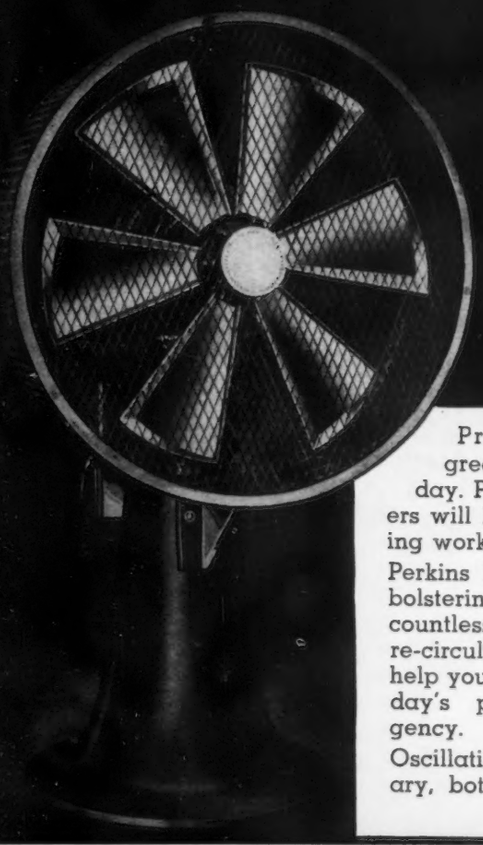
Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade . . . . . 3.50c.

PERKINS MAN COOLERS

TRADE MARK REGISTERED UNITED STATES PATENT OFFICE



Production, your great problem of today. Perkins Man Coolers will help a lot, relieving workers in hot places. Perkins Man Coolers are bolstering production in countless plants. Constant re-circulation of air will help your men to meet today's production emergency.

Oscillating and Stationary, both types portable.

E37

B. F. PERKINS & SON, Inc.

ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = $200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½
Wrought Iron		
¼ and ⅜ in.	+9	+10
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

THESE
Spiral Wound
BRUSHES
Will Help You Do It!

● Pittsburgh Plate Glass Company's Spiral Wound Brushes are saving money for manufactures of light gauge metal. By stepping up production—by reducing finishing costs—by providing a product of more uniform quality.

Investigate! Consult with our field representatives. These men are trained technicians who thoroughly understand finishing problems. They will gladly work with you in developing Spiral Wound Brushes—of horsehair, nickel silver wire or tampico—to meet your specific finishing requirements.

Write, wire or phone for futher information.

PITTSBURGH
PLATE GLASS COMPANY
BRUSH DIVISION · BALTIMORE, MD.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, bessemer, 51.50%...	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%.....	4.60
Mesaba, non-bessemer, 51.50%.	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

	Per Unit
African, Indian, 44 to 48% Mn.	57c. to 61c.
African, Indian, 49 to 51% Mn.	60c. to 65c.
Brazilian, 46 to 48% Mn...54c. to 59c.	
Cuban, del'd, duty free, 51% Mn.	67½c. to 71c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered....$23 to $24	
Tungsten, domestic, scheelite, delivered	$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade).....	Nom.
Rhodesian, 45%	$25.00
Rhodesian, 48% ....$28.00 to $30.00	

RAILS, TRACK SUPPLIES

	F.o.b. Mill
Standard rails, heavier than 60 lb., gross ton.....	$40.00
Angle bars, 100 lb.....	2.70
F.o.b. Basing Points	
Light rails (from billets), gross ton $40.00	
Light rails (from rail steel), gross ton	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel.....	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads..	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)....	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail...	$20.00 to $21.00
Domestic, f.o.b. Ohio River landing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines...	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid.....	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick	*Per 1000 f.o.b. Works*
Super-duty brick at St. Louis..	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois.....	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio.....	39.90
Ground fire clay, per ton	7.10
Silica Brick	
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55
Chrome Brick	*Net per Ton*
Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	
Magnesite Brick	
Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00
Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

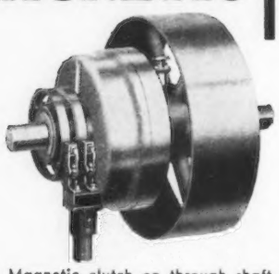
*None available.

Bring Your
POWER
TRANSMISSION
Problems to
Stearns
MAGNETIC

For safely, economically and efficiently transmitting stops and starts by accurate near or remote control there is a STEARNS Magnetic Clutch or Clutch and Brake combination or Magnetic Brake in size or design to adequately take care of your problem.

We are pioneers in the development and application of magnetic friction devices of all types. Our many years of practical experience in the manufacture of magnetic equipment is available to you.

What's your problem? Whether in your plant or product—we invite your inquiry. No obligation. Write for our Bulletin 225 on magnetic clutches or Bulletin 604 on magnetic brakes.



Magnetic clutch on through shaft, loose pulley application

Magnetic clutch-brake combination

A.C. or D.C. Magnetic brakes for motor or machine mounting

STEARNS MAGNETIC MANUFACTURING CO.
635 S. 8th St. Milwaukee, Wis.
SEPARATORS—PULLEYS—DRUMS—MAGNETS

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... ... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract per net ton.....$157.50

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

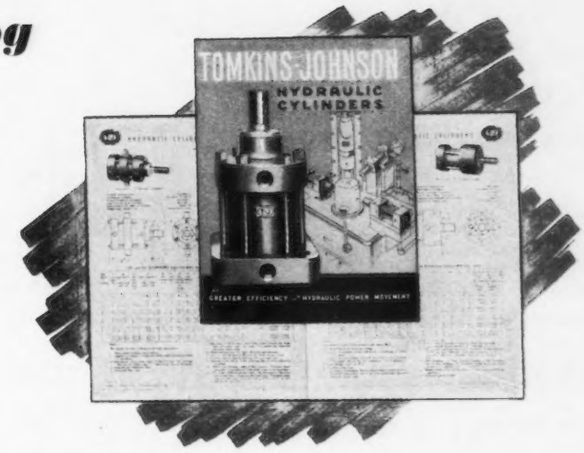
FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.20c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.50c.
No. 4 industrial, del'd Cleveland.5.25c.
No. 5 indus., del'd Cleveland...5.125c.
No. 6 indus., del'd Cleveland...4.875c.

new T-J

HYDRAULIC CYLINDER

catalog



Types of Hydraulic Cylinder cushioning action are differentiated. Maximum allowable strokes per piston rod diameter are tabulated. Augmenting these and the cylinder specifications and dimensions are tables of pressures applied (for from 250 to 1500 pounds pressure p. s. i.) and practical hydraulic cylinder installation data.

Your request on your company's letter head brings your copy promptly.

address

THE TOMKINS-JOHNSON CO.

628 North Mechanic Street, Jackson, Michigan

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$5.50 to $5.75

Foundry, f.o.b. Connellsville, prompt .....$6.00 to $6.50

F'dry, by-product, Chicago 10.50

F'dry, by-product, New England 13.00

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia. 11.63

F'dry, by-product, Cleveland... 11.55

F'dry, by-product, Cincinnati... 11.00

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export £29 16s. 3d.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth..£16 10s.

Beams, open hearth....£19 10s.

Channels, open hearth..£19 10s.

Angles, open hearth....£15 10s.

Black sheets, No. 24, gage £22 5s. max.* £22 5s. min.**

Galvanized sheets, No. 24 gage £25 12s. 6d. max.*; £25 12s. 6d. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$25.50***	***$25.00***	***$26.50***	***$26.00***	.....
Brooklyn	***27.50***	.....	.....	***28.00***	.....
Jersey City	***26.53***	***26.03***	***27.53***	***27.03***	.....
Philadelphia	***25.84***	***25.34***	***26.84***	***26.34***	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24 00	.....
Sharpsville, Pa.††	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	29.50
Cincinnati	***24.44***	***24.61***	.....	***25.11***	.....
Canton, Ohio	***25.39***	***24.89***	***25.89***	***25.39***	.....
Mansfield, Ohio	***25.94***	***25.44***	***26.44***	***25.94***	.....
St. Louis	***24.50***	***24.02***	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24 00	.....
Youngstown††	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	***26.63***	.....	***27.13***	***26.63***	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	20.38	19.00	25.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	.....	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$23.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

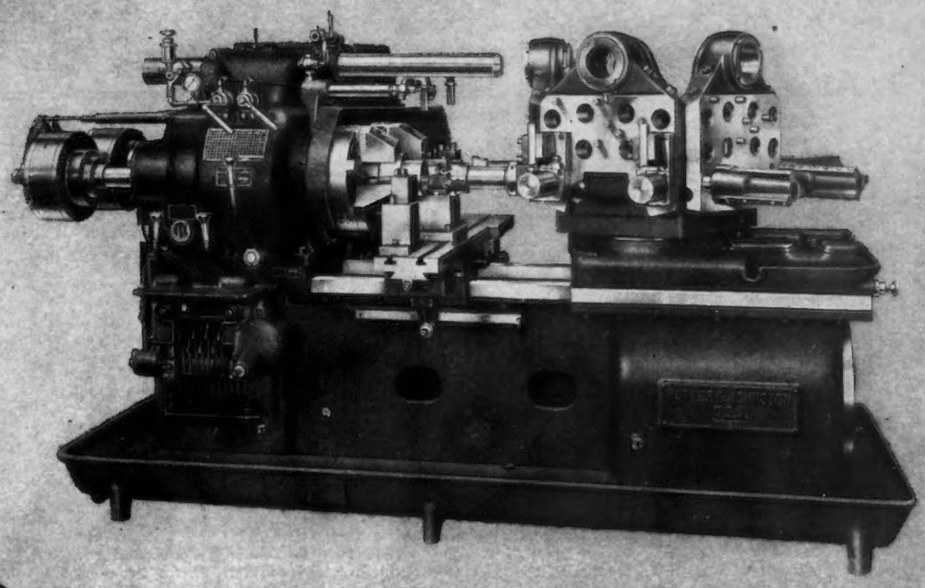
††Pittsburgh Coke & Iron and Struthers furnaces are quoting $24.50 a ton for No. 2 foundry, basic and malleable, and $25.00 a ton for bessemer iron at Sharpsville and Youngstown.

WAREHOUSE PRICES

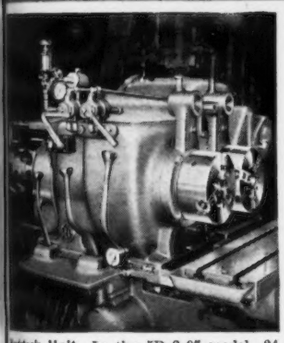
	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3 05	$3.35	$3.75	$3.58	$3.23	$3.25	$3.71	$3.45	$3.39	$3.30	$3.38	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	3.68	....	4.12	4.35	4.23	6.50
Sheets, galvanized	4.75	4.60	4 62	4.90	5.00	4.64	4.75	5.11	4.75	4 87	4.75	4 98	5.25
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.48*	3.82	4.06	3.70	3.74	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.22	3.46	....	3 61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.35	3.69	3.80	3.68	4.15
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3 85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled	3.35	3 50	3 25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3 63	4.15
Bars cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4 02	4.34	3 88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.60	7.42	7.35	7.50	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5 75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8 40	8.56	8.84	8.45	8.40	8.63	....	8 77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7 75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6 98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

P & J

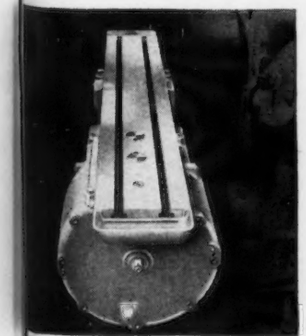


5D 2-9" 2-12" E2-15 POWERFLEX

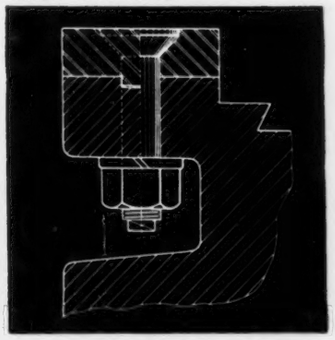


Headstock Unit—In the 5D-2-9" model, 24 speed changes between 27 and 615 R.P.M. are provided; in the 5D-2-12" and 5D-E-15", there are 28 changes of speed.

Automatic Speed and Feed Changes—These Power-Flex automatics are provided with power operated automatic clutches under dog or hand control. Feed and speed may be changed while cutting.



Turret Slide Unit—Adjustable longitudinally on bid ways so that slide can always be kept in correct relation to work in chuck or spin-dle base fixture.



Steel Ways—Hardened and ground and applied to bed and turret slide—a construction that assures permanent alignment of spindle and turret—a development pioneered by P & J.

A 2 SPINDLE HEADSTOCK CONTRIBUTES TO LOWER PRODUCTION COSTS . . .

This P & J machine is designed to meet production demands beyond those possible from a single spindle unit.

As in all P & J machines, outstanding features are offered which assure great flexibility, high production capacity, accuracy and operating convenience.

The 5D Power-Flex two spindle models are a logical modern development of the single spindle design and have proved their brilliant, cost-cutting performance in many branches of the metal working industry.

Complete details will be found in Bulletin No. 111, a copy of which is yours for the asking.

POTTER & JOHNSTON MACHINE COMPANY, PAWTUCKET, R.

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Goss & De Leeuw Machine Co.**, New Britain, Conn., chucking machinery and parts, has let general contract to Aberthaw Co., 80 Federal Street, Boston, for one-story addition, 40 x 200 ft., to plant at Kensington, Conn. Cost close to $100,000 with equipment.

Leland-Gifford Co., Lincoln Highway, Worcester, Mass., drilling, tapping and other machine tools and parts, plans expansion for production of equipment for Navy Department. Fund of about $1,360,000 will be furnished by Government for project.

Building Committee, Worcester Polytechnic Institute, Worcester, Mass., has let general contract to R. L. Whipple Co., 44 Portland Street, for three-story and basement mechanical engineering building, 56 x 200 ft. Cost about $350,000 with equipment. Appleton & Stearns, 50 State Street, Boston, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 18 for composition castings, with machine work, for running and signal lights, including barrels, rings, boxes, adjustment plates, insulating base spiders, lower and upper lamp bases, mast caps and terminal rings (Schedule 900-4610), aluminum alloy boxes for similar lights, aluminum alloy box rings, aluminum alloy tops, aluminum alloy boxes, lens rings, covers, etc. (Schedule 900-4611), washers and insulating bases for similar lights (Schedule 900-4612), for Portsmouth, N. H., Navy Yard.

Bath Iron Works Corp., Bath, Me., has let general contract to E. C. Snodgrass, 67 Colonial Road, Portland, Me., for three-story shop at shipbuilding plant, for welding department, storage and distribution. Cost about $400,000 with equipment. Fund in that amount has been secured through Navy Department.

American Car & Foundry Co., 30 Church Street, New York, has let general contract to B. Kline Co., Milton, Pa., for one-story addition, 105 x 560 ft., to branch plant at Milton. Cost close to $300,000 with equipment.

Republic Tool & Die Corp., Long Island City, N. Y., Wendel Sorrenson, president, a new company, has leased two-story building at 43-11 Crescent Street for plant.

Munitions Mfg. Corp., recently organized subsidiary of International Business Machines Corp., 590 Madison Avenue, New York, plans new plant at Poughkeepsie, N. Y., for production of aircraft cannon for Government, which will provide fund of $7,255,000 for project, $4,000,000 of which will be used for purchase of machine tools and other equipment.

Winthrop Chemical Co., 170 Varick Street, New York, has let general contract to William G. Sheehan Construction Co., 28 DeWitt Street, Albany, N. Y., for one-story addition to plant at Rensselaer, N. Y. Cost close to $50,000 with equipment.

Babcock & Wilcox Co., 85 Liberty Street, New York, boilers, stokers, etc., plans expansion in branch plant at Alliance, Ohio, for production of ordnance equipment for Government. Cost about $250,000 for machinery. Federal appropriation in that amount to be provided.

Marsh Valve Co., 307-15 Brigham Road, Dunkirk, N. Y., radiator valves, etc., has approved plans for one-story addition, about 60 x 95 ft., for expansion in foundry. Cost about $50,000 with equipment.

Pittsburgh, Shawmut & Northern Railroad Co., St. Marys, Pa., plans reopening of maintenance and repair shops at Angelica, N. Y., closed since May, 1938. Main shops at St. Marys were partially destroyed by fire recently, with loss close to $100,000 with equipment, and will be rebuilt soon, necessitating use of Angelica shops.

Electro Metallurgical Co., Niagara Falls, N. Y., has approved plans for one-story addition to plant at Alloy, W. Va., about 25 x 300 ft. Cost close to $100,000 with equipment.

State Department of Education, State Education Building, Albany, N. Y., plans new shops at St. Lawrence University, Potsdam, N. Y., for welding, metal-working, toolmaking and other mechanical work. Cost about $300,000 with equipment.

Waverly Machine & Tool Co., Irvington, N. J., a new organization, has leased one-story building at 1126 Grove Street, for manufacture of mechanical equipment.

Crucible Steel Co. of America, Inc., 405 Lexington Avenue, New York, will make further extensions in branch plant at Harrison, N. J., in addition to expansion previously noted, for production of ordnance for Government, which has authorized a fund of $2,466,500.

United States Industrial Chemicals, Inc., 60 East Forty-second Street, New York, has let general contract to Damon G. Douglas Co., 605 Broad Street, Newark, N. J., for two-story addition to plant at Newark. Cost over $50,000 with equipment.

Metal Hose & Tubing Co., Inc., 253 Tillary Street, Brooklyn, oil and gasoline hose, has purchased large part of former plant of Richardson & Boynton Co., at Dover, N. J., stoves, heaters, etc., consisting of two-story building, about 110,000 sq. ft. of floor space, on 3½-acre tract. Brooklyn property has been taken over by city for street-widening and entire plant will be removed to new location. Dover works are scheduled to be ready in May.

General Electric Co., Philadelphia, and Schenectady, N. Y., has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story addition, 110 x 300 ft., to plant on Elmwood Avenue, Philadelphia. Cost over $175,000 with equipment.

Commanding Officer, Ordnance Department, Philadelphia, has let contract to J. J. Kelly Co., 5906 York Road, for one-story building at naval ammunition depot, Fort Mifflin, at $65,285, exclusive of equipment, for a projectile loading plant.

Reading Sheet Metal Products Co., Chestnut Street, Reading, Pa., has let general contract to Potteiger Co., West Reading, for new one-story plant, 100 x 350 ft. Cost close to $100,000 with equipment. Muhlenberg, Yerkes & Muhlenberg, Gardner Building, are architects.

Fleetwings, Inc., Bristol, Pa., aircraft and parts, plans new works for production of airplane parts for Government. Cost about $2,484,000. Fund in that amount will be provided by Defense Plant Corp., Washington, Federal agency.

Fox Grinders, Inc., Oliver Building, Pittsburgh, grinding equipment, plans new one-story plant, about 60 x 85 ft., at Harmony, Pa. Cost about $45,000 with equipment.

Mesta Machine Co., West Homestead, Pa., rolling mill machinery, hydraulic equipment, etc., has approved plans for one-story addition, 60 x 1000 ft., for production of 155 mm. cannon for Army Department. Cost over $1,500,000 with equipment. New unit will adjoin a one-story building, 60 x 900 ft., now being completed for production of guns for Army.

United Drug Co., 43 Leon Street, Roxbury, Boston, plans new three-story factory branch, storage and distributing plant in Northside district, Pittsburgh, 125 x 200 ft. Cost over $225,000 with equipment. Hunting, Davis & Dunnells, Century Building, Pittsburgh, are architects.

Quartermaster, Bolling Field, D. C., asks bids until April 22 for grate castings for gutter drainage purposes, 3 or 5-ft. lengths, 12½ in. wide and 1½ in. thick (Circular 154-20).

Standard Wholesale Phosphate & Acid Works, Inc., 5701 Pennington Avenue, Baltimore, acids, fertilizer products, etc., has let general contract to Whiting-Turner Contracting Co., Stewart Building, for one-story building, 130 x 360 ft., for mixing acid phosphate, storage and distribution. Cost close to $100,000 with equipment.

United States Engineer Office, Baltimore, asks bids until April 17 for two one-story warehouse buildings at Middletown Air Depot, Middletown, Pa.

Purchasing Officer, Department of Interior, Washington, asks bids until April 14 for one diesel engine, wide gage, crawler type tractor for Mancos, Colo. (Circular 7273).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 15 for motor-driven press brakes (Schedule 6124), drying ovens (Schedule 6110), field rheostats (Schedule 6157), motor-driven sheet metal forming and flanging machines (Schedule 6119), motor-driven street sweepers (Schedule 6154), motor-generator set (Schedule 9092), four motor-driven sheet metal shrinker machines (Schedule 6112), motor-driven, bench-type honing and bushing machines (Schedule 6109), welding control panels (Schedule 6145), gasoline truck mounted cranes (Schedule 6143), motor-driven, double-type hammers (Schedule 6130), chains and fittings (Schedule 6101); until April 17 for crucibles without covers (Schedule 6159), for Eastern and Western Navy yards.

The South

• **Combustion Engineering Co., Inc.**, Hedges-Walsh-Weidner Division, 1032 West Main Street, Chattanooga, Tenn., boilers, tanks, etc., has approved plans for one-story addition, about 23,000 sq. ft. of floor space, for expansion in machine shop. Cost over $75,000 with equipment. J. E. Morelock is company engineer.

Alabama Power Co., Birmingham, plans further expansion in steam-electric power plant at Mobile, Ala., where work is in progress on station additions; also will make extensions in transmission and distributing lines, and power substation facilities in same area. Cost about $3,000,000.

Dayton Rubber Mfg. Co., Dayton, Ohio, automobile tires and tubes, etc., has let general contract to Merchant Construction Co., 290 Biltmore Avenue, Asheville, N. C., for branch mill at Hazelwood, N. C., with power house, machine shop and auxiliary structures. Cost close to $100,000 with equipment. Guyer & Neuffer, Ludlow Arcade Building, Dayton, are architects.

Kentucky & West Virginia Gas Co., 231 South LaSalle Street, Chicago, P. C. Van Gilst, vice-president in charge of operation, plans new compressor plant at Dwale, Ky., in connection with pipe line construction for natural gas transmission in that district; also will make extensions in compressor stations at Drift and Right Beaver, Ky., including equipment. Cost close to $500,000 with equipment.

State Procurement Office, Treasury Department, Columbia, S. C., asks bids until April 15 for power press brakes (Circular 27031); until April 14 for flat files, mill files, etc. (Circular 27035).

Allied Oil Terminal Co., St. Elmo, Ill., plans new bulk oil storage and distributing plant near Riverside Park, Memphis, Tenn., steel storage tanks, pumping station and other facilities. Cost reported over $85,000.

Todd-Galveston Dry Docks, Inc., Pelican Dike, Galveston, Tex., affiliated with Todd Shipyards Corp., 1 Broadway, New York, has let contract to W. Horace Williams Co., Inc., 833 Howard Avenue, New Orleans, for new

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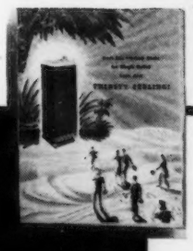

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naval drydock at new shipbuilding plant on Pelican Island, Galveston, 614 ft. long; also will build structural and mechanical shops and other yard structures. Entire project will cost about $2,800,000. Plant will be used for construction of vessels for Government, which has provided appropriation for work. Frederic R. Harris, Inc., 27 William Street, New York, is consulting engineer.

Owens-Illinois Glass Co., Ohio Building, Toledo, Ohio, has purchased tract near Waco, Tex., for new branch plant, for which plans will be prepared at once. It will include machine shop, power house and other structures. Cost over $500,000 with equipment.

Central States

• **Economy Pumps, Inc.,** Weller Avenue, Hamilton, Ohio, pumping machinery and parts, has let general contract to Antenen Engineering Co., East and Hanover Streets, for one-story addition, 33 x 115 ft. A traveling crane will be installed. Cost close to $70,000 with equipment.

Ridge Tool Co., Ridge Road, Elyria, Ohio, pipe tools, etc., has asked bids on general contract for one-story addition, 200 x 260 ft. Cost close to $175,000 with equipment. Alfred G. Hall, 964 Brunswick Road, Cleveland, is engineer.

Eaton Mfg. Co., Inc., Axle Division, 739 East 140th Street, Cleveland, has arranged with Defense Plant Corp., Washington, Federal agency, for fund of $388,966 for expansion for production of aircraft parts for Government, in conjunction with extensions in plant now under way.

King Machine Tool Co., Clifton Street and B. & O. Railroad, Cincinnati, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story plant at Paddock and Tennessee Streets, for production of equipment for Government. Cost about $500,000 with equipment. This is part of expansion for Federal work to total $1,575,000 for which Government appropriation has been authorized.

Ilsco Copper Tube & Products, Inc., 5629 Madison Road, Cincinnati, has let general contract to Wolter Construction Co., 2153 Kindel Street, for new one-story plant, 90 x 240 ft., in Westover district, Mariemont. Cost over $125,000 with equipment. Felsberg & Gillespie, Ingalls Building, are architects.

Galion Metallic Vault Co., Galion, Ohio, plans new one-story plant, 50 x 600 ft. Cost over $150,000 with equipment. Althouse & Jones, Farmers' Bank Building, Mansfield, Ohio, are architects.

Jackson Iron & Steel Co., Roberts Street, Jackson, Ohio, iron and steel products, plans one-story addition for increased capacity. Cost over $250,000 with equipment.

Aeroproducts Division, General Motors Corp., Dayton, Ohio, plans further expansion in one-story plant now in course of construction, totaling about 193,000 sq. ft., to more than double that floor area. Entire plant will be used for production of airplane propellers for high-power engines for Army pursuit aircraft. Entire project will cost over $1,000,000 with equipment.

Sibley Machine & Foundry Co., 206 East Tutt Street, South Bend, Ind., castings, drilling machinery and parts, etc., plans one-story addition, 75 x 100 ft., for expansion in foundry. Cost close to $50,000 with equipment. William E. Fett, 914 Washington Street, Mishawaka, Ind., is consulting engineer.

Bendix Aviation Corp., Weiss Joint Division, South Bend, Ind., plans expansion, including additional equipment for production of airplane engine parts for Government. Cost about $300,000. Fund will be secured through Defense Plant Corp., Washington.

Emge & Son, Inc., Fort Branch, Ind., meat packer, has awarded general contract to W. L. Yokum Construction Co., Dubuque, Iowa, for five and seven-story addition, 105 x 117 ft. Cost over $200,000 with equipment. Henschien, Everds & Crombie, Inc., 59 East Van Buren Street, Chicago, is architect and engineer.

District Public Works Officer, Ninth Naval District, Great Lakes, Ill., asks bids until April 22 for buildings for naval reserve aviation base at Robertson, near St. Louis, including hangar, 202 x 354 ft.; assembling and repair shop, 102 x 162 ft., and 37 ft. high; steam power house, 39 x 41 ft.; paint and dope shop, 33 x 63 ft.; storage and distributing building, 30 x 80 ft., and other structures.

Columbian Steel Tank Co., 1509 West Twelfth Street, Kansas City, Mo., has approved immediate erection of one-story addition, 85 x 107 ft., for expansion in galvanizing department. Cost over $70,000 with equipment.

Wickes Brothers, Inc., Washington Avenue, Saginaw, Mich., metal-working machinery and parts, blue printing machines, etc., plans one-story addition, 79 x 190 ft., for expansion in machine shop. Cost over $75,000 with equipment. Frantz & Spence, 118 North Washington Avenue, are architects.

Wilcox-Rich Division, Eaton Mfg. Co., Saginaw, Mich., engine valves and other automotive engine parts, will carry out expansion for production of airplane engine parts for Government. Fund of $278,000 has been arranged with Defense Plant Corp., Washington, for purchase of equipment. Similar expansion will be carried out at branch plant at Marshall, Mich. Fund of $31,785 has been allotted for equipment purchases.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, plans addition, 32 x 40 ft., to steam power house, with new coal bunker, coal-handling machinery and other equipment. Cost close to $55,000. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

Chevrolet Motor Division, General Motors Corp., Flint, Mich., has approved plans for five one-story additions to plant No. 10, used for sheet metal stamping and other operations, totaling about 76,000 sq. ft. of floor space. Cost close to $400,000 with equipment.

United Screw & Bolt Corp., 2513 Cullerton Avenue, Chicago, has let general contract to Campbell, Lowrie, Lautermilch Corp., 400 West Madison Street, for two-story addition, 90 x 125 ft. Cost over $130,000 with equipment. Olsen & Urbain, 8 East Huron Street, are architects.

Illinois Gear & Machine Co., 2100 North Natchez Avenue, Chicago, has let general contract to A. S. Hedstrom Construction Co., 4647 West Lake Street, for one-story addition, 125 x 150 ft. Cost over $100,000 with equipment. Rapp & Rapp, 230 North Michigan Avenue, are architects.

Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago, engines, pumps, parts, etc., have let general contract to Cunningham Brothers, 359 East Grand Avenue, Beloit, Wis., for two one-story additions to plant at Beloit, 100 x 230 ft., and 46 x 100 ft., for expansion in pump-manufacturing division and heat-treating plant respectively. Cost over $150,000 with equipment.

Pioneer Engineering Works, Inc., 1515 Central Avenue, Minneapolis, Minn., sand and gravel plant equipment, has let general contract to Dean L. Witcher, 3327 Holmes Avenue South, for one-story addition, 60 x 120 ft., for expansion in machine shop. Cost close to $50,000 with equipment. E. R. Ludwig, Essex Building, is architect.

Kaukauna Machine Corp., Kaukauna, Wis., machinery and parts, iron castings, etc., has asked bids on general contract for one, two, three and four-story addition, 60 x 80 ft. Cost close to $60,000 with equipment. Raymond N. LeVee and Maurey L. Allen, 315 West College Avenue, Appleton, Wis., are architects.

Leach Co., South Main Street, Oshkosh, Wis., logging machinery, mixing equipment, etc., has let general contract to E. H. Meyer Construction Co., 75 Main Street, for one-story addition, 100 x 150 ft. Cost over $50,000 with equipment.

General Electric X-Ray Corp., 2012 West Jackson Boulevard, Chicago, will take bids at once on general contract for five-story and basement addition, 115 x 120 ft. Cost over $250,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

Commissioner of Subways and Superhighways, Room 1940, 20 North Wacker Drive, Chicago, asks bids until April 17 for electric equipment for State Street subway, including conduits, wires and cables, electrical cabinets, switchboard, outlet boxes and auxiliary equipment (Contract E-1).

Western States

• **Board of Education,** 1151 South Broadway, Los Angeles, will take bids soon on general contract for one-story school of aeronautics on Sepulveda Boulevard, near municipal airport, 60 x 188 ft., as branch of Frank Wiggins trade school. Cost over $65,000 with equipment. Architectural Department, A. S. Nibecker, Jr., architect, is in charge.

Western Electric Co., Inc., 195 Broadway, New York, has let general contract to L. H. Hoffman, 715 S. W. Columbia Street, Portland, Ore., for new one-story factory branch, storage and distributing plant at 1245 N. E. Forty-seventh Street, Portland. Cost close to $135,000 with equipment. A. E. Doyle & Associates, Pacific Block, Portland, are architects.

Bureau of Reclamation, Denver, asks bids until April 28 for one 40,000-hp., vertical-shaft hydraulic turbine and one oil-pressure actuator-type governor for Parker hydroelectric power station, Parker Dam project, Arizona-California.

Seattle School District No. 1, 810 Dexter Avenue, Seattle, has let general contract to Hans Ness, 6220 First Avenue, N. W., for three-story addition to Edison Vocational School, 1700-14 Harvard Avenue, 120 x 120 ft. Cost close to $235,000 with equipment. Naramore & Brady, Dexter-Horton Building, are architects.

Amalgamated Sugar Co., Ogden, Utah, plans new one-story mechanical drying plant for sugar beet service at New Plymouth, Idaho. Cost over $185,000 with machinery.

General Water Heater Corp., 9 East Cypress Street, Burbank, Cal., has let general contract to E. S. McKittric Co., 7839 South Santa Fe Avenue, Huntington Park, Cal., for one-story addition, 50 x 120 ft. Cost close to $50,000 with equipment. Niles Werner, 257 South Spring Street, Los Angeles, is consulting engineer.

North American Aviation, Inc., 5701 Imperial Highway, Inglewood, Cal., airplanes and parts, has let general contract to Austin Co., Los Angeles, for one-story addition. Cost over $75,000 with equipment.

Custodian, Border Station, Babb-Piegan, Mont., asks bids until April 25 for deep-well pumping unit and accessories, for water service.

Canada

• **Canadian General Electric Co., Ltd.,** Peterborough, Ont., plans one-story addition for production of gun carriages and aircraft equipment for Dominion Government. Cost over $500,000 with equipment.

Canadian National Railways, 360 McGill Street, Montreal, plan expansion and improvements in car and locomotive repair shops at Fort Rouge, Man., including equipment. Cost close to $125,000 with equipment.

Department of Munitions and Supply, Dominion Government, Ottawa, Ont., has plans for one-story aircraft-manufacturing plant at Cartierville, Que., with main one-story unit, 300 x 400 ft., and auxiliary buildings. Cost over $350,000 with equipment. L. A. and P. C. Amos, 133 Commissioners Street, Montreal, are architects.

Modern Tool Works, Ltd., 15 Van Horne Street, Toronto, plans new one-story plant. Cost close to $60,000 with equipment.

United Steel Corp., King Street, Welland, Ont., has awarded general contract to Gardner Construction Co., Ltd., River Bank Street, for $50,000 plant addition.

Sarnia Elevator Co., subsidiary of Toronto Elevators, Ltd., Queen's Quay, Toronto, has awarded general contract to Carter-Halls-Aldinger Co., Ltd., 419 Cherry Street, Toronto, for erection of grain elevator at Sarnia, Ont., to cost $250,000.

Link-Belt, Ltd., 791 Eastern Avenue, Toronto, has awarded general contract to Milne & Nicholls, 57 Bloor Street West, for $50,000 plant addition. Ewart, Armer & Byam, 36 Toronto Street, are engineers.